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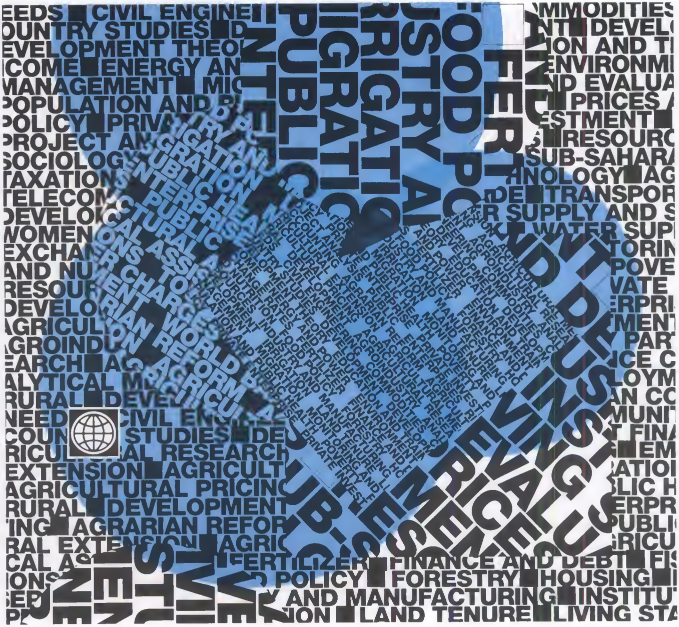
Irrigation Management Transfer in Mexico

Process and Progress

Cecilia M. Gorriz, Ashok Subramanian, and José Simas



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Cecilia M. Gorriz is a consultant and Ashok Subramanian is an institutions specialist, both in the Agriculture and Natural Resources Division of the Agriculture and Natural Resources Department of the World Bank. José Simas is a senior water resources engineer in the Country Department II of the Latin America and Caribbean Department of the World Bank.

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FOREWORD

The Water Resources Management Policy (1993) of the World Bank has stressed the need for decentralization as an important element of an integrated approach to water resources management: "*The principle is that nothing should be done at a higher level of government that can be done satisfactorily at a lower level. Thus where local or private capabilities exist and where an appropriate regulatory system can be established, the Bank will support central government efforts to decentralize responsibilities to local governments and to transfer service delivery functions to the private sector, to financially autonomous public corporations, and to community organizations such as water user associations.*"

Mexico has undertaken a radical program of decentralization and private sector promotion in irrigation. The program has involved substantial policy changes, agency restructuring, and transfer of management responsibilities to autonomous water user organizations. The operation and maintenance functions of about two-thirds of the 80 irrigation districts, have been transferred to user organizations. This program has been supported by several international organizations including the Inter-American Development Bank, the Food and Agriculture Organization, and the World Bank. The program has also been a source of inspiration and ideas for many developing countries that have sent their irrigation officials to Mexico for observation and study.

There is, however, a critical gap in information in English on the Mexican program. Our departments have worked together to fill that gap and to produce this paper on the developments in Mexico. The objective is to assist people interested in decentralization and private sector promotion in irrigation to understand and learn from the Mexican experience and adapt it to suit local circumstances.

Alexander McCalla
Director
Agriculture and Natural Resources
Environmentally Sustainable Development

Edilberto Segura
Director
Country Department II
Latin America and the Caribbean

ABSTRACT

Considerable literature is available on irrigation management transfer from government agencies to Water User Organizations (WUOs) worldwide. Since 1989, the Mexican government has implemented a radical program of restructuring the irrigation sector. An important element of this program has been the transfer of irrigation district management to WUOs. However, there is inadequate documentation of the transfer process in English. This paper is an initial effort to fill the gap.

Elements of irrigation management transfer in Mexico presented in this paper include the status of the program, the legal and institutional frameworks, the financial arrangements, and the training and communication programs. This paper is not intended as an evaluation of the program. Some initial lessons for other countries attempting to start or expand such a transfer program are offered. Annexes to the paper present the National Water Law and a sample Title of Concession giving the users the legal right to operate and manage the irrigation system.

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GLOSSARY

ASERCA	Supports and Services for the Field *Apoyos y Sevicios para el Campo*
CNA	National Water Commission *Comisión Nacional del Agua*
IMTA	Mexican Institute of Water Technology *Instituto Mexicano de Tecnologia del Agua*
INIFAP	National Institute of Agriculture and Forestry Research *Instituto Nacional de Investigación Agropecuaria y Forestal*
O&M	Operation and maintenance
SARH	Secretariat of Agriculture and Water Resources *Secretaria de Agricultura y Recursos Hidráulicos*
SLR	Society of Limited Responsibility *Sociedad de Responsabilidad Limitada e Interes Público*
WUO	Water User Organization

EXECUTIVE SUMMARY

The Mexican economic crisis of the 1980s stimulated a wide variety of reforms in Mexican agriculture. Among the most significant institutional reforms was the program to transfer management responsibility of irrigation operations from the public sector irrigation agency to organizations of water users at the level of the irrigation district. As of December 31, 1994, full or partial management responsibility for 55 irrigation districts with a command area of about 2.5 million hectares has been transferred to water users' organizations (WUOs). The reform program has attracted the attention of irrigation officials from other developing countries interested in enhancing the role of WUOs in the management of irrigation systems in their countries.

What is the Mexican reform all about? We outline in some detail the essential elements of the program elaborating on its institutional, financial and policy aspects. The aim of this paper is to fill a gap of basic documentation and information on a bold reform effort in irrigation so that others starting out on the road to change may benefit from the Mexican experience.

In sum, the Mexican program centers on developing a public-private partnership with new roles for the users and the National Water Commission—*Comision Nacional del Agua* (CNA)—the government agency concerned with water management. In the past, the government built, operated and managed 3 million hectares of large surface irrigation schemes organized into 80 irrigation districts. With the reform program, the management of these schemes is being handed over to WUOs known as *Asociaciones Civiles*, who manage irrigation subsystems or *módulos*, varying in command area from 5,000 to 20,000 ha. These WUOs are responsible for operation and maintenance (O&M) functions of secondary irrigation and drainage systems. Elected leaders negotiate water management and rehabilitation needs with CNA's managers at the district level. Where possible, the WUOs form a user organization at the level of the irrigation district to undertake O&M activities of the main irrigation system.

A number of countrywide policy and legal changes have been put in place to support these reforms. A new National Water Law—*Ley de Aguas Nacionales*—has been promulgated. The CNA and the WUOs sign a concession agreement that specifies the mutual roles and responsibilities of the agency and the water users. A training and communications program has facilitated the process of transfer. Internally, the WUOs have a system of charging for irrigation services and mobilizing resources for O&M. To supplement the management transfer program, the government has launched an on-farm development initiative to enhance farm level productivity and water conservation as well as a program to register and assign water rights to users.

The Mexican transfer program is being assisted by international organizations, including the Food and Agricultural Organizations (FAO) and the Inter-American

Development Bank (IDB). The World Bank is assisting the management transfer and on-farm improvement programs through two major loans, *Irrigation and Drainage Sector Project* approved in December, 1991 and *On-Farm and Minor Irrigation Networks Improvement Project* approved in February 1994.

Farmers' contributions to O&M have dramatically changed since the transfer process has been implemented, mainly due to user management and a sense of "ownership" of the system. This experience highlights the importance of the following key ingredients of the transfer program:

- strong government commitment and policy support
- favorable macroeconomic conditions
- establishment of strong legal and institutional frameworks
- adjustments to new roles by both farmers and the government irrigation agency
- substantial increase in farmer contribution to O&M and on-farm capital improvements
- training and communication programs

Clearly, it is too early to tell much about the sustainability of the Mexican program and what its long-term efficiency, equity, financial and environmental impacts may be. But it is certain that irrigation management, dominated by a government-built system and government-operated services, as the Mexicans had known it until 1989, was not sustainable and is unlikely to be revived. The present reform program makes a radical departure from past practice. Its short-term effects are noteworthy. Its long-term impacts will have to be carefully monitored.

CHAPTER I

OVERVIEW

Role of Irrigated Agriculture in the Economy

Mexico has a total land area of almost 2 million km^2 and is classified as an arid and semi-arid country. The agricultural sector plays an important role in the economic development of the country. It currently accounts for about 8.4 percent of GDP and employs 23 percent of the economically active population. Irrigated agriculture contributes about 50 percent of the total value of agricultural production and accounts for about 70 percent of agriculture exports. While the value of agricultural production remained almost unchanged during the 1980s, irrigated agriculture's share of the value of production grew from 45 to 55 percent. The primary irrigated crops cultivated are presented in Table 1.1.

Table 1.1: Primary Irrigated Crops in 1990-91

Crop	*Value of Production (Percent)*
Forages, seeds, fruits, vegetables	27
Maize	21
Wheat	18
Sorghum	13
Beans	6
Soya	6
Sugar	6
Safflower	3
Total	100

Source: World Bank (1994).

Irrigation Systems and Availability of Water Resources [1]

The type and size of the irrigation systems depend on the climate, water resource availability and arable land distribution. In Mexico annual mean rainfall is 870 mm. Rainfall varies from less than 50 mm in the central part of the Baja California peninsula, to more than 5,000 mm in parts of Southeast Mexico. About 60 percent of the population is located in the arid and semiarid zones, which cover two-thirds of the national territory, making water demand the highest where water availability and supply are the least.

In the densely populated Central Region, the annual rainfall is 600 to 900 mm. In irrigation districts where groundwater is available, second season cropping is practiced. With the absence of large rivers and storage reservoirs, irrigation schemes are small and the average farm size is 3 ha.

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[1] Adapted from World Bank (1991).

In the Northwest and North Central Regions, where annual precipitation is about 200 to 500 mm, cropping which would not be possible without irrigation, is confined to the winter season. Mexico's largest integrated irrigation systems are found in the Northwest Region along the river valleys that drain from the Sierra Madre mountain range into the Pacific. In this region, the average farm size is between 15 and 20 ha In the eastern part of the region along the Gulf coast, annual precipitation is about 600 to 1,300 mm and the average farm size is 10 to 20 ha.

In the North and Northwest Regions, extensive irrigation systems, large and small dams, and wells for groundwater extraction have been developed. In the Central and North Regions, surface water is scarce and economically feasible dams have already been constructed. Also, aquifers are already overexploited in these regions, dropping groundwater levels almost 3 m per year. On the northwestern coast, in the states of Sonora and Baja California, salt water intrusions are a problem.

Of the 5.2 million ha under irrigation, 3.2 million ha are organized into 80 irrigation districts and were managed by the National Water Commission—*Comision Nacional del Agua* (CNA)—prior to the management transfer to Water User Organizations (WUOs). About 1.8 million ha are organized into privately-run or collectively-run small scale systems between 50 and 200 ha (2/3 of which are groundwater supplied) called irrigation units. The remaining land is in unregulated areas, built and operated by private individuals. Much of Mexico's irrigation is gravity-based with large schemes developed around storage reservoirs, diversion dams, and conveyance canals. Table 1.2 presents the size distribution of irrigation districts in Mexico.

Table 1.2. Distribution of irrigation districts by size

Range of area (ha)	***Number of irrigation districts***	***Irrigated area (ha)***
<10,000	24	131,900
10,001-50,000	39	980,821
50,001-100,000	9	690,256
100,001-200,000	3	374,817
> 200,000	5	1,158,377
Total	80	3,336,171

Source: CNA (1994).

Performance of Irrigation Systems

The national financial and budgetary crisis of August 1982 impacted on investment in new irrigation systems and on funding for maintenance of existing irrigation districts. In nominal terms, public investment in the sector plummeted from US$3,600 million in 1981 to US$230 million in 1990. In 1988, investment in irrigation infrastructure was less than 3 percent of total public expenditure compared with around 10 percent in 1978.

Historically, the cost of operation, administration, and maintenance of the irrigation districts was paid by both the government and farmers, the latter through payment of water fees. Over time the share of farmer contributions decreased. In the early 1960s, farmers paid about 65 percent of the operation and maintenance (O&M) and administration costs. But by the end of the 1980s, farmer contributions to the budget had fallen to only 18 percent, with the remainder of the budget being covered by public expenditures.

The decrease of user contribution to the costs of the O&M and administration in addition to the decline of government funding resulted in substantial deterioration of the irrigation and drainage infrastructure. In the early 1990s, most of the irrigation and drainage systems were in major disrepair and unresponsive to farmer demands for water deliveries. Water conveyance losses in the gravity-based irrigation schemes were about 40 percent and losses in the minor canals were about 20 percent. At the farm level, losses are between 30 and 50 percent, resulting in an overall conveyance efficiency of about 30 percent. By comparison, overall conveyance efficiency in California and Arizona ranges from 50 to 60 percent, allowing the same given area to be irrigated with almost half as much water (World Bank, 1994).

Government Policy

Since the 1950s, the Mexican government has intervened throughout the agricultural sector using direct and indirect policies. The government established and supported marketing and input supply parastatals, imposed import controls, guaranteed producer prices, mandated production targets for growers, invested in irrigation and other infrastructure, limited land transactions, marketed crops and subsidized fertilizers, farm credit and crop insurance. These policy measures resulted in distorted market signals and minimized private investment in the agricultural sector.

Irrigation policy discouraged private participation and investment. For the most part, it was an instrument of agrarian reform and self-sufficiency in the production of basic grain. The government provided subsidies for inputs into irrigation, including electricity, irrigation water, agrochemicals, and seeds, thereby distorting the production decisions of farmers away from unsupported crops.

These policies failed to improve growth, rural poverty and nutrition of the poor. Parastatals agencies incurred fiscal and economic costs. Restrictions in the laws regulating intellectual property inhibited research, development, and adoption of new technology. Legal obstacles to land transactions, most notably among *ejido* [2] farmers who had land use rights but no property rights, discouraged investments in land and resulted in sub-optimal uses of land.

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[2] There are two types of land tenure in Mexico: private lands owned by "small" landowner farmers (*pequeños propietarios*) and communal lands farmed by "*ejido*" farmers (*ejidatarios*). On average, the size of the landholding of the "small" landwoners is about 5-20 ha. The *ejido* farmers are provided with an entitlement to work and cultivate the land, but they do not own the land. Recent legislative changes have permitted *ejido* farmers to sell or rent their land.

Decentralization of the Irrigation Sector

The economic crisis of the 1980s led to drastic changes in Mexico's agricultural and irrigation policies, supported by international organizations, including the World Bank.[3] The government improved agricultural incentives by drastically depreciating the real exchange rate and improving the sectoral terms of trade. Since mid-1989 substantial reforms have taken place in:

- agricultural prices and trade policy;
- agricultural input pricing;
- interest rates for agricultural credit; and
- public sector ownership and management.

The current government strategy is to restore economic growth through private investment in irrigation and drainage supported by the public sector. In price and trade policy, the primary thrust of the reforms has been to move towards market determined prices, incorporating the private sector in agricultural commodities marketing, and opening domestic production to external competition. Change in agricultural input prices exemplify the government's decision to move towards a system of pricing inputs using international prices, marginal cost or scarcity value.

Moreover, the government has introduced significant public sector reforms. Substantial changes have been brought about in public agencies and state companies involved in production, marketing, water, seeds, and agricultural finance. The government has decreased the number of staff in the Ministry of Agriculture and Water Resources (SARH) and privatized many of its services. Specifically, the government has undertaken the following reforms:

- guarantee prices of 10 of 12 previously supported commodities have been removed;
- many public agriculture enterprises have been liquidated;
- subsidies for fertilizers, pesticides, machinery and crop insurance have been eliminated;
- research and extension services has been strengthened;

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[3] These changes have been supported by two World Bank-assisted Agriculture Sector Adjustment Loans, AGSAL I and the on-going AGSAL II, and the Fertilizer Sector Adjustment operation. The main vehicles in irrigation are: (i) the *Irrigation and Drainage Sector Project* expected to help modernize irrigation systems and facilitate the transfer of irrigation management to WUOs; and (ii) the *On-farm and Minor Irrigation Networks Improvements Project* that seeks to make the Mexican irrigation subsector more efficient and less reliant on government funds, through shared investment by beneficiaries and the government. Both projects are cofinanced by the World Bank and the Inter-American Development Bank (IDB) and are substantially assisted by the Food and Agricultural Organization (FAO).

- spending on targeted food programs for the poor has been increased and a pilot rural health and nutrition program has been implemented.

The National Development Plan (1989-1994) calls for an increase in agriculture production primarily by improving the efficiency in the use of existing irrigation schemes and, only on an exceptional basis, through the expansion of irrigated area. Using this strategy, the government has sought to attain the following objectives in the irrigation sector:

- transfer O&M responsibility of irrigation districts to WUOs and increase users' contribution to O&M expenses and investment costs;
- promote efficient use of existing infrastructure by giving priority to rehabilitation, modernization and completion of existing works;
- promote adoption of improved irrigation techniques leading to a more efficient use of land and water resources;
- prevent expansion of irrigated areas in those regions where water resources are over-exploited, except when expansion results from improved water use efficiency;
- prevent degradation of water resources by controlling the release of toxic substances into water courses and by avoiding over-exploitation of the aquifers;
- allocate investment resources, combining cost-effectiveness with social and income distribution criteria;
- enact legal reforms in land tenure and water rights;
- increase private sector participation in decisions and investment; and
- to promote a shift away from the production of basic grains.

Under the National Program for Decentralization of the Irrigation Districts, derived from the National Development Plan (1989-1994), the Mexican government initiated the management transfer of irrigation districts to Water User Organizations (WUOs) in 1989. The National Program, implemented by the CNA, originally programmed the transfer of operation and maintenance of 21 irrigation districts, comprising 1.98 million ha. To date, actual transfers far exceed the target of 1.98 million ha of area during the 1990-1994 period.

CHAPTER II

IRRIGATION MANAGEMENT TRANSFER: THE CURRENT SITUATION

Introduction

There are 80 irrigation districts whose size varies between 3,000 to 270,000 ha with an average farm size of 6 ha. Nationally, 71 percent of the users are characterized as *ejido* farmers and 29 percent are "small" landowner farmers. As of December 31, 1994, a total area of 2,458,366 ha has been transferred to 319,451 farmers organized into 316 WUOs, known in Mexico as *Asociaciones Civiles*. Each WUO operates and manages a *módulo*, an irrigation subsystem, ranging from 5,000-20,000 ha in size. Of the total number of irrigation districts, management responsibility have been transferred completely in 38 districts and partially in 16. In addition, 5 Societies of Limited Responsibility—*Sociedades de Responsabilidad Limitadad, Interes Público y Capital Variable* (SRL)—have been formed. An SRL is a user organization at the district level and is responsible for the administration and operation of the *main* irrigation and drainage network and the maintenance equipment and machinery. Table 2.1 presents a regional breakdown of the transferred area.

Table 2.1: Transfer of area organized into irrigation districts

Region	*Area organized into irrigation districts (ha)*	*Area transferred (ha)*	*Regional distribution of total area transferred (%)*	*Actual area transferred in region (%)*
Northwest	1,463,524	1,371,900	55.8	94
North	698,485	548,598	22.3	79
Northeast	233,323	75,420	3.1	32
Lerma Balsa	541,459	382,254	15.5	71
Valley of Mexico	184,527	68,069	2.8	37
Southeast	97,028	12,125	.5	12
Country Total	3,218,346	2,458,366	100.0	

Notes: Regional distribution of total area transferred = area transferred in region/total area transferred in country*100; Actual area transferred in region = area transferred/area organized into irrigation districts in region*100.
Sources: CNA (1995).

Most of the area organized into irrigation districts is in the Northwest Region of Mexico. As of December 31, 1994, most of the area transferred to WUOs is located in the Regions of the Northwest (55.8 percent), North (22.3 percent) and Lerma Balsas (15.5 percent). Thus far about 3 percent of the area transferred is in the Northeast and Valley of Mexico Regions, and less than 0.5 percent of the transferred area is located in the Southeast Region.

The data in Table 2.1 also show that most of the area organized into irrigation districts in the Northwest and North Regions has been transferred to WUOs. However in the Southeast Region, only 12 percent of the area has been transferred to WUOs.

Table 2.2 presents the number of *módulos* and users found in the various regions. More than 40 percent of the users in Mexico are organized into 136 WUOs located in the Northwest Region.

Table 2.2: Number of modulos and users involved in the transfer

Region	*Number of Módulos*	*Percent of Total Number of Módulos*	*Number of Users*	*Percent of Total Number of Users*
Northwest	136	42.3	134,126	42.0
North	62	20.1	53,499	16.7
Northeast	12	3.9	13,737	4.3
Lerma Balsa	80	25.2	81,624	25.6
Valley of Mexico	17	5.5	33,376	10.4
Southeast	9	2.9	3,089	1.0
Total	316	100.0	319,451	100.0

Sources: CNA (1994).

Process of Irrigation Management Transfer [4]

The management transfer of irrigation districts to WUOs is being carried out in two stages. In Stage 1, the irrigation agency determines the irrigation districts to be transferred as well as the physical boundaries of the *módulos* in the irrigation districts. In addition, the WUOs in each of the *módulos* are established and a master plan for complete transfer and rehabilitation and/or modernization is developed. Specifically, the following activities are carried out:

1. The physical boundaries of the *módulos* are proposed by CNA field engineers based on the following considerations:

    - **Hydraulics features of the irrigation scheme**: water delivery should be easy to accomplish.
    - **Social aspects**: in some cases there were irreconcilable situations between the *ejido* and small landowner farmers, which required re-adjustments in the definitions of the *módulos*. However, hydraulic conditions were never overlooked.
    - **Economies of scale**: the size of the *módulos* were to be defined such that economies of scale are maximized. Clearly, as the size of the *módulos* decreases, O&M costs tend to increase. Conversely, as the size of the *módulos* increases, the O&M costs may decrease but the organizational and administrative costs rise. With the implementation of the transfer program in Mexico, it has been found that the size for cost effective transfer is about 5,000 to 8,000 ha for each *módulo*.

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[4] Adapted from Trava, J.L. (1994) and World Bank (1991).

1. Users are informed of the purpose of the transfer, its scope and procedures, as well as of their rights and obligations in the transfer program. At the same time, CNA assesses the users' capacity and willingness to operate, maintain and administer the infrastructure and equipment of the módulo to be transferred.

2. The users are organized into WUOs, which includes the formation and election of the Executive Council and the General Assembly.

3. The CNA determines the annual costs of normal O&M for the distributary network, the secondary drainage network and their respective roads and infrastructure for each of the módulos to be transferred.

4. The Instructions for Operation, Maintenance and Administration of each módulo is drafted. The CNA and the respective WUO reach agreement on a Master Plan for rehabilitation and/or modernization which includes an assessment of the irrigation district (the water distribution and control systems, the condition of irrigation infrastructure and the plans for maintenance and equipment, the financial status and irrigation fees, the users' administrative and technical ability, the organization and local policy factors, and the technical, administrative and financial feasibility of the transfer), a feasibility study of the project for rehabilitation and modernization of the irrigation infrastructure, a program for financial self-sufficiency and a detailed schedule of the transfer.

5. The legal instruments constituting each WUO is registered and deposited with a notary public.

6. The CNA and the WUO formalize the Title of Concession.

7. An inventory of machinery and equipment is carried out, including a listing of the assets to be transferred and an assessment of the need for additional equipment and/or repair of existing equipment.

8. A training program is initiated in which the users and the CNA jointly determine the technical and training needs.

Stage 2 of the transfer program involves the formation of the SRLs. It should be noted, however, that Stage 2 has been implemented in only five irrigation districts as of December 1994. Specifically, the activities include the following:

1. The formal constitution of the WUOs of a given irrigation district into an SRL.

2. Compiling the Instructions for Operation, Maintenance and Administration of the irrigation district.

3. Notarizing the deed constituting the given SRL.

4. Physical transfer of the main system, infrastructure, machinery and equipment from the district office of the CNA to the newly formed SRL

5. Training of the SRL staff by the CNA in planning, operation and administration of the irrigation districts

With the completion of this last step, the CNA begins its new role of permanent supervision of compliance with the terms established in the Title of Concession and the accompanying Instructions for Operation, Maintenance and Administration granted to the WUOs (these legal documents are discussed in Chapter III).

Operation and Maintenance of the Irrigation System

Prior to the transfer of the irrigation districts to WUOs, the government was responsible for the operation, maintenance and administration of the entire irrigation district. Maintenance and administration of the irrigation and drainage canals, structures, roads and other infrastructure was the responsibility of the irrigation district. Farmers requested water from the district office of the CNA and depending on water availability, the water was delivered. The costs for O&M and administration of the irrigation districts were primarily covered by public expenditure.

With the reform program, operation, maintenance and management of irrigation districts are the responsibility of water users in partnership with the CNA. The CNA no longer manages the total irrigation system, but provides "water in bulk" to the WUOs and operates and maintains the main system (storage and diversion dams as well as main structure, canals and drains), for which the users must pay. The CNA also provides other services to WUOs, including information on institutional and organizational issues, agricultural markets, finance, irrigation technology, crops and water management, and conflict resolution.

Users, organized into WUOs, now have an active role. The WUO is responsible for carrying out the maintenance of the irrigation and drainage canals, the corresponding infrastructure and roads. At the time of the transfer, the CNA "concessions" its maintenance equipment and machinery to the WUOs in the district to facilitate easy start-up (see Box 2.1). Some WUOs have also chosen to purchase their own maintenance equipment and machinery from the balance of water fees. The work is carried out or contracted out and supervised by the manager of the *módulo* employed by the WUO. The manager is hired by the WUO, and he, in turn, hires a chief of ditchriders, a secretary and an accountant. The manager is responsible for O&M of the *módulo*. In most cases, the manager of the *módulo* is a privately hired professional replacing CNA personnel.

Box 2.1: Technological improvement for O&M

Another important ingredient to facilitate the transfer program is the technological improvement in the operation and maintenance of the transferred districts. The main sub-components are the following:

- the improvement of communication of efficient operation
- use of new monitoring technologies
- the appropriate selection of technology and equipment mix to perform the cleaning of irrigation and drainage canals.

All the sub-components are intended to reduce costs and improve efficiency under a "service concept" to the users. About 70 percent of the O&M costs are related to the cleaning of irrigation canals and drainage channels. With the selection of the appropriate technology and machinery mix, the costs are being substantially reduced. In most of the cases, the reductions in O&M costs have been from 35 to 75 percent compared with the maintenance expenditures incurred with traditional technologies

The CNA and the Mexican Institute of Water Technology—*Instituto Mexican Institute of Water Technology* (IMTA)—are carrying out an extensive program of machinery selection and purchase for operation and maintenance. The program comprises of testing and evaluation, selection, procurement, preparation of manuals, training of mechanics and operations staff, transfer to the WUOs, and evaluation.

For each irrigation district and *módulo*, an assessment is prepared to determine a specific maintenance routine including, mechanical cleaning combined with chemical and biological weed control wherever relevant and the appropriate machinery mix to carry out those activities. The package of machinery is purchased and then transferred to the WUOs. The machinery mix, which in the past was composed primarily of drag-lines, now consists primarily of light and modern equipment such as hydraulic mowers over tractors, retro-excavators, and hydraulic excavators.

The program is expected to ensure more sustainability for the transfer program and increase the level of self-sufficiency in the collected water fees to accomplish an adequate level of O&M.

The structure of participation ensures that the users will act at the appropriate level to support efficient and effective functioning of the WUO. It ensures user participation and subsequent cooperation in the determination and collection of water fees and maintenance of the *módulos*. Roles and functions of the general body of the WUO, its governing body and its management and staff have been specified. Oversight committees exist to ensure that the respective agencies of the WUO carry out their specified responsibilities. All positions except WUO staff are voluntary and are elective offices. Equitable representation is provided for both the *ejido* and small landowner farmers. Details of the internal organization of the WUO are presented in Chapter III.

Water Management

At the beginning of the cropping season, the CNA estimates the quantity of water that is available for each irrigation district, including carry over storage and estimates of surface and groundwater. This information is made available to the local district offices of the CNA for dissemination among the WUO in the district.

At the level of the *módulos*, before the start of a cropping season, farmers submit their cropping plan to the WUO. The staff of the WUO use the individual plans to prepare an irrigation plan for the *módulo*. Once the preliminary irrigation plans are formulated by the manager of each *módulo*, they are sent to the district office of the CNA. The CNA reviews the plans collectively and approves the allocation of water for each *módulo*. Adjustments may need to be made at the level of the district or *módulo*. Water is delivered to the *módulos* by block system (bulk) through volumetric measurement according to the schedules agreed upon between the WUOs and the CNA. Equity among *módulos* is an important consideration in the allocation. Any requests for changes during implementation of the irrigation plan must be made to the Hydraulic Committee of the irrigation district and approved by the district office of the CNA. Further discussion regarding the Hydraulic Committee is presented in Chapter III.

In many irrigation districts, water is distributed to the users based on a seven to fourteen day rotation. After the establishment and the transfer of the *módulo* to the WUO, many WUOs have turned to an improved arranged demand system and are making necessary technical and administrative changes. In *módulos* that are well established, water is delivered to the users within 72 hours.

For scheduling of irrigation water under the new arranged demand system, procedures are established according to which users must place their requests daily for irrigation water to the ditchriders, who sort them by farm inlet and ditch and then present them to the managers of the WUOs. The managers, in turn, sort them by canal and direct intake and calculate the total requirement for the *módulos*, taking into account conveyance losses. The requests from the *módulos* are presented to the CNA's district office where the water requirements are estimated for release from the storage reservoir after taking into account the losses through the main canal. In cases where a farmer has access to ground water through a private tubewell, the user must obtain permission from the CNA to use it for irrigation.

The WUO delivers water to the user at the farm intake. Beyond the farm intake, water management and use is the responsibility of the farmer. To have water delivered, the user must comply with the bylaws of the WUO, which specifies that users must:

- present a planting permit and an irrigation permit for the crop or crops to be planted;
- be current in their payment of water fees;
- keep on-farm irrigation systems in good condition;
- prepare land to be irrigated for irrigation; and
- be ready to receive water at the designated day and time.

Once the user has complied with these requirements and obligations, the canal operator delivers the water requested by the user. Water is measured by the canal operator using measurement structures at parcel intakes (where they exist) or by supplying water by surface area and crop. The canal operator maintains records of water deliveries and issues daily reports to the manager of the WUO.

Water Fees

In addition to the responsibility for O&M and administration at the distributary level, the WUO is also required to collect and administer fees for irrigation services. The WUO also has to pay the CNA for block water deliveries. If an SRL exists at the main system level, the WUO must also contribute to the SRL.

In most of the irrigation districts, water fees have increased substantially after the transfer of the irrigation districts to the WUOs. Table 2.3 presents the water fees of several irrigation districts in various parts of the country. Most of the irrigation districts had the same water fee in 1992 and 1993 because management transfer had not yet taken place. When the transfer of the *módulos* took place in 1994, the water fees increased considerably.

Table 2.3: Water fees for selected districts and módulos (N$ '000 m³)

District	*Módulos*	*Region*	*1992*	*1993*	*1994*	*Percent increase for 1992-94 period*
Don Martin	7	Northeast	15.80	18.02	24.75	57%
Culiacan-Humaya	III-2	Northwest	16.29	16.23	25.93	59%
Edo. De Zacatecas	6	North	9.57	9.57	17.75	85%
Costa de Hermosillo	Costa de Hermosillo	Northwest	2.00	2.00	3.00	50%
Bajo Rio San Juan	IV-1	Center North	2.67	6.92	7.48	180%
Tulancingo.	II	Valley of Mexico	13.64	13.64	19.78	45%
Metztitlan	I	Valley of Mexico	9.09	9.09	16.26	79%

Note: N$ = Nuevos Pesos (New Mexican Pesos). As of December 1994 US$1.00 = N$3.30.
Source: CNA (1994).

Nationally, about 80 percent of costs for operation and maintenance are covered by the collection of water fees from users. This is a substantial increase from 1991 when the rate of financial self-sufficiency was 57 percent (World Bank, 1995). Table 2.4 presents the percent of normal O&M costs covered by the collection of water fees in all irrigation districts in the country—those that have been completely and partially transferred and those that have not yet been transferred to WUOs. The highest rate of financial self-sufficiency is found in the Northwest, North and Northeast Regions.

Table 2.4: Rate of financial self-sufficiency in 1994

Region	*Financial Self-Sufficiency (%)*
Northwest	90
North	69
Northeast	78
Lerma Balsa	58
Valley of Mexico	37
Southeast	45

Source: World Bank (1994).

If only the completely transferred irrigation districts are considered, the rate of financial self-sufficiency in 20 of those districts is greater than 80 percent and 12 of those districts have a water fee collection rate greater than 100 percent (World Bank, 1994). In some cases, the surplus is used to purchase machinery and equipment for maintenance to supplement that which is turned over to the users at the time of the management transfer.

At the level of the *módulos*, monitoring and auditing of the accounting books of the WUO is the responsibility of the WUO's Oversight Committee (*Consejo de Vigilancia*), while at the irrigation district level it is the responsibility of the Hydraulic Committee (The functions of these committees are elaborated in Chapter III). Books are audited annually. Where there is a complaint of impropriety in the handling of WUO funds, the district office of the CNA may intervene through the Hydraulic Committee.

CHAPTER III

LEGAL AND INSTITUTIONAL ARRANGEMENTS FOR TRANSFER

Introduction

A policy of greater user participation implies changes in the roles of both government and farmers. The government's role is redefined from one of performing all the activities involved in the irrigation subsector to one of assisting and supporting water users. The users' role changes from passive participants to participatory actors and decision-makers. Legal and institutional arrangements designed to facilitate the new roles are described below.

Legal Framework

At the national level, the legal framework for the transfer process is provided by the National Water Law. At the level of the irrigation district and the *módulo*, the Title of Concession is the legal instrument that identifies and describes the duties and obligations of all parties involved in the management transfer of a *módulo* to a WUO.

National Water Law and Regulations

The National Water Law, promulgated in December 1992 and made law in January 1994, supersedes the Federal Water Law of 1972 as the legislative framework for efficient and rational modernization, management and distribution of Mexico's national water resources. It continues a legislative tradition that began with the Irrigation Law of 1926. National water resources and related public assets are the responsibility of the Federal Executive Branch. The National Water Law provides for the their overall management, with greater participation from users and improved water resources planning. Under the National Water Law, the CNA is the sole federal water authority responsible for water management. The National Water Law is presented in Annex 1.

Title of Concession

The National Water Law and its Regulations stipulate that every user, both public and private, must have a license or concession to use the national water resources and/or a permit to discharge waste water into the river basin system. This concession is granted by the CNA, which is also responsible for establishing and up-dating the National Water Register. The new legislation also provides for the formation of WUO and the establishment of a Public Registry of Water Rights, ensuring the user's right to water.

Farmers who form a WUO must be granted a Title of Concession of Water and the Use of Hydraulic Infrastructure, and the accompanying Instructions on the Operation, Maintenance and Administration of the *módulo*. These documents stipulate the conditions for the exploitation and use of national water resources for irrigation as well as the operation, maintenance, and administration of the hydraulic infrastructure by the WUO of the specified *módulo*. The infrastructure that is "concessioned" includes the secondary canals and drainage systems, and respective roads and hydraulic structures located in the specified *módulos*. The headworks and the irrigation and drainage canals of the main system, and respective roads and infrastructure continue to be operated, maintained and managed by the CNA with the cost charged to the WUOs in the irrigation district.

The Title of Concession defines the role of the CNA as a supervisory one, in which the CNA ensures that the WUO is in accordance with the National Water Law and its Regulations, as well as the Title of Concession and Instructions, which stipulate that fees for irrigation service are to be determined in accordance with the Instructions of Operation, Maintenance and Administration and should be sufficient to cover the O&M and administration costs of the *módulos*. The Title of Concession, which has a duration of 20 years, also specifies the rights and obligations of both the CNA and the WUO and the reasons for suspension or revocation of the Title of Concession. A sample Title of Concession is presented in Annex 2.

Water Rights

Water rights are established through the granting of concessions for water use and permits for the discharge of water into water courses or into the ground. Water use concessions or discharge permits clearly define user rights and obligations as well as the CNA's authority and power of discretion. The government, through CNA, is establishing a Public Registry of Water Rights to ensure legal certainty of water rights, to solve problems associated with third party effects and externalities, and to provide the background and flow of information needed for water markets to operate. It is anticipated that water use efficiency would improve through the operation of the water rights system and water markets.

The CNA has the power to establish water reserves and allocate water resources through the bidding of water rights. Transmitting water rights is allowed and regulated by the CNA. Preparatory work for the enforcement of the new system of water rights, through the granting of water use concessions and discharge permits, has been completed. It is anticipated that by the end of 1995, most existing users, representing over 70 percent of present volume of water withdrawals and over 70 percent of pollutant discharges, adding up to about 60,000 users, will be registered (Gonzalez Villareal, 1993).

Institutional Arrangements

The transfer of irrigation districts to WUOs has required a change in the institutional arrangements used to manage and operate irrigation districts. The management transfer has resulted in different roles for the government agency and the users.

CNA

Before 1989, management and administration of the water sector was under the charge of the under-Secretariat of Hydraulic Infrastructure, which formed a part of the Secretariat of Agriculture and Water Resources (SARH). In light of the policy changes enacted to improve the management of the nation's water resources and promote the decentralization of the irrigation and drainage sector, the CNA was established in January 1989, as one of five decentralized administrative bodies within the SARH (see Figure 3.1).

The CNA is the national water authority in the country and is responsible for the use, allocation, handling, and conservation of water resources at the rural and urban levels for agricultural, municipal, and industrial use. The functions assigned to the CNA by the Regulations of the SARH range from planning, programming, study, construction, administration, and O&M to rehabilitation of the irrigation systems. The majority of these functions are carried out through 80 irrigation district offices and the following sub-directorates: Planning and Finance, Infrastructure, Urban and Industrial Hydraulic Infrastructure, Water Management, and Administration (see Figure 3.2).

In order to respond to the regional water management problems in an integrated fashion, the CNA has six Regional Management Offices (*Gerencias Regionales*), that are responsible for the administration of water within the hydrological basins. These regional offices are the Northwest, North, Northeast, Lerma-Balsas, Valley of Mexico, and Southeast. The organizational structure within each of the Regional Management Offices is presented in Figure 3.3

For its local work at the state level, the CNA has established 32 State Offices (Gerencias Estatales) in each of the 31 and one federal district. An organizational breakdown of the state offices is presented in Figure 3.4. These local CNA offices are charged with technically supporting the state government, the municipal authorities and the WUOs to improve the water use efficiency in the agriculture, municipal, and industrial sectors. Programs are carried out through the General Resident Project Engineers, who execute construction activities, and the Irrigation District Head Offices, that carry out operation, maintenance, and supervisory activities (World Bank, 1993). The rights and obligations of the CNA in the transfer of an irrigation district to a WUO are presented in Box 3.1.

Figure 3.1: Organization of Secretariat of Agriculture and Water Resources (SARH)

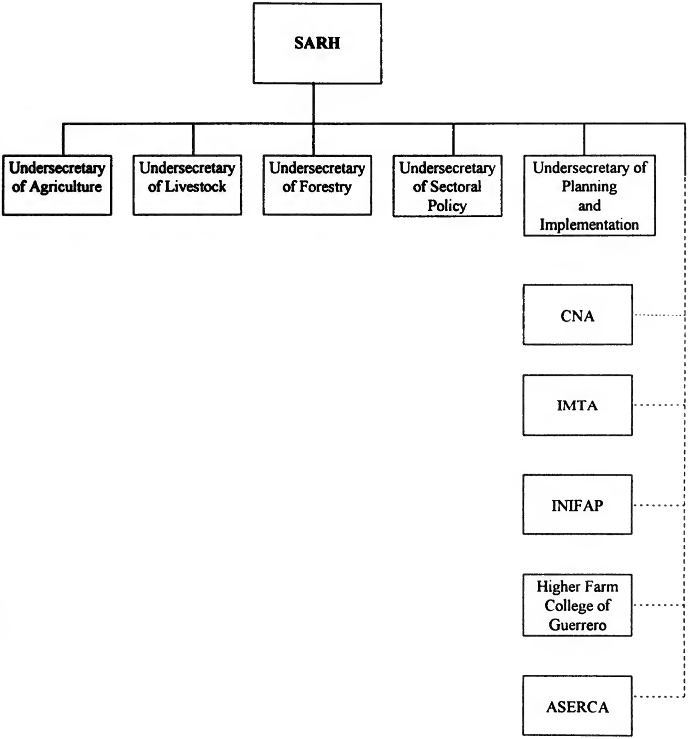

SARH
Undersecretary of Agriculture
Undersecretary of Livestock
Undersecretary of Forestry
Undersecretary of Sectoral Policy
Undersecretary of Planning and Implementation
CNA
IMTA
INIFAP
Higher Farm College of Guerrero
ASERCA

Figure 3.2: Organization of National Water Commission (CNA)

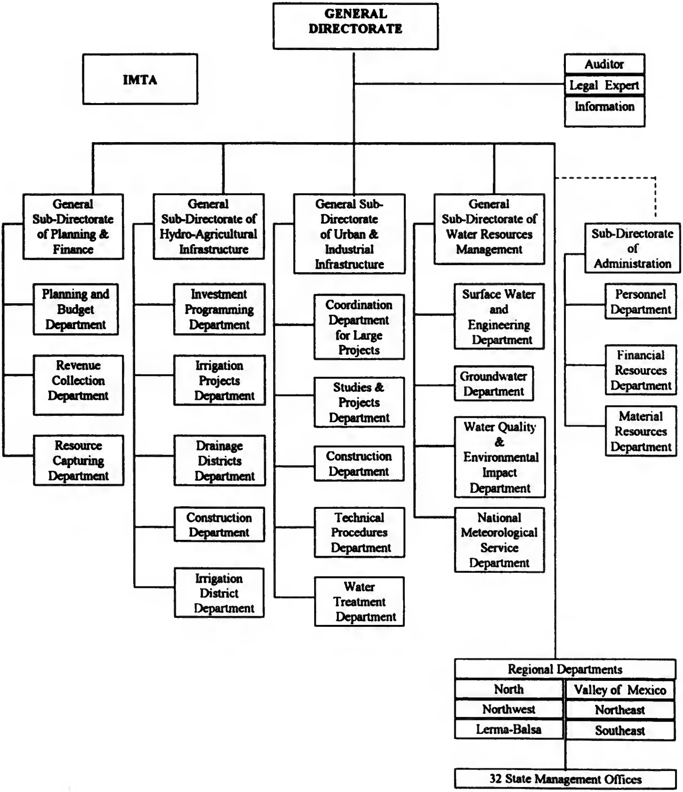

GENERAL DIRECTORATE
IMTA
Auditor
Legal Expert
Information
General Sub-Directorate of Planning & Finance
Planning and Budget Department
Revenue Collection Department
Resource Capturing Department
General Sub-Directorate of Hydro-Agricultural Infrastructure
Investment Programming Department
Irrigation Projects Department
Drainage Districts Department
Construction Department
Irrigation District Department
General Sub-Directorate of Urban & Industrial Infrastructure
Coordination Department for Large Projects
Studies & Projects Department
Construction Department
Technical Procedures Department
Water Treatment Department
General Sub-Directorate of Water Resources Management
Surface Water and Engineering Department
Groundwater Department
Water Quality & Environmental Impact Department
National Meteorological Service Department
Sub-Directorate of Administration
Personnel Department
Financial Resources Department
Material Resources Department
Regional Departments
North
Valley of Mexico
Northwest
Northeast
Lerma-Balsa
Southeast
32 State Management Offices

Figure 3.3: Organization of the CNA Regional Offices

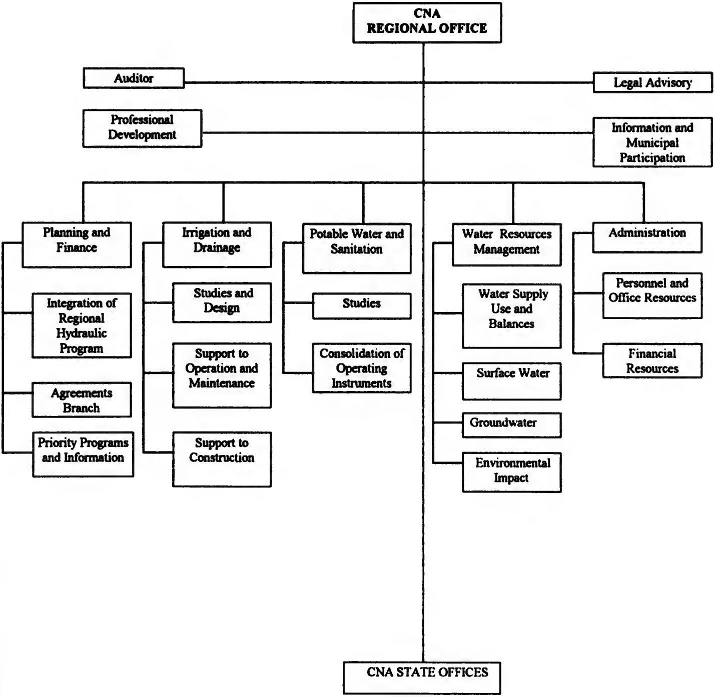
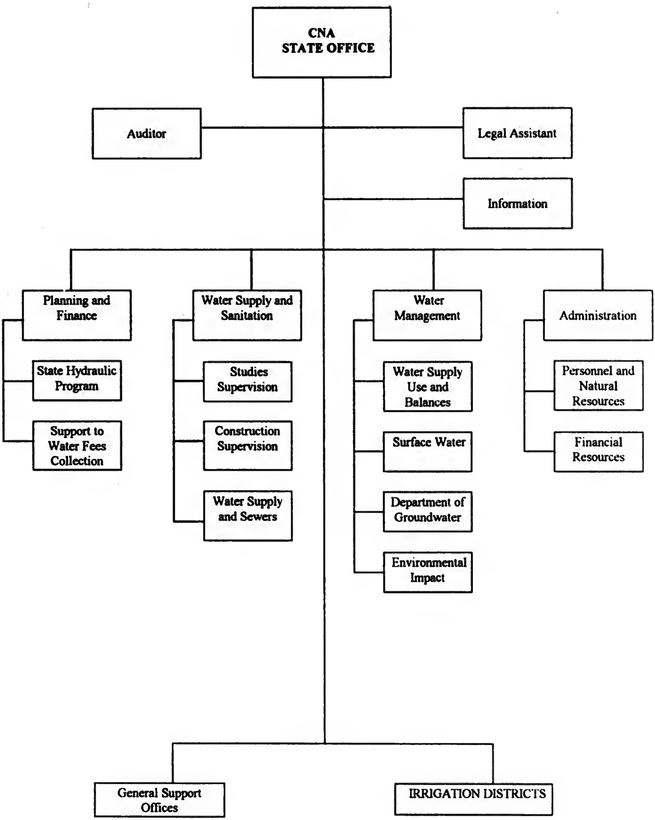

CNA REGIONAL OFFICE
Auditor
Legal Advisory
Professional Development
Information and Municipal Participation
Planning and Finance
Integration of Regional Hydraulic Program
Agreements Branch
Priority Programs and Information
Irrigation and Drainage
Studies and Design
Support to Operation and Maintenance
Support to Construction
Potable Water and Sanitation
Studies
Consolidation of Operating Instruments
Water Resources Management
Water Supply Use and Balances
Surface Water
Groundwater
Environmental Impact
Administration
Personnel and Office Resources
Financial Resources
CNA STATE OFFICES

Figure 3.4: Organization of the CNA State Offices



Box 3.1: Rights and Obligations of the CNA

Under the Title of Concession granted by the CNA to the WUOs, the CNA has the following responsibilities:

At the time of the initial establishment of the WUO, the CNA:
- draws up, revises and amends the Operations, Maintenance and Management Instructions in conjunction with the WUO
- provides the WUO with available equipment and machinery that was previously used by the CNA in that irrigation district
- establishes a public registry of water users
- notifies and collects hydrometric data and production statistics necessary for the Operations, Maintenance and Management instructions

In the day-to-day operation of the irrigation district, the CNA:
- operates, maintains and administers the primary network of canals and the respective drainage network, roads and wells, where this is the will of the General Assembly of the SRL
- determines and publicizes at the start of each agriculture cycle, the quantity of available water to enable the WUO to formulate its own irrigation plan
- delivers water in bulk to the WUO efficiently
- supervises the O&M and administration of the secondary network by the Civil Association and of the primary networks of canals, drainage works and roads by the respective SRL
- ensures that water distribution by the WUO is carried out efficiently and to enforce the application of the regulations governing the use of water for irrigation purposes
- approves the water fee determined by the WUO for that agriculture cycle
- collects from the WUO the irrigation service fees and suspend water supply for nonpayment
- approves the WUO annual infrastructure maintenance program and ensure that it is carried out
- provides technical advice for maintenance
- disseminates knowledge on irrigation technology, productivity, salinity and drainage, land use planning and laboratory techniques for water, soil, and plant analysis
- supports technical and administration training programs
- organizes and carries out with the WUO all emergencies works of infrastructure protection and repair
- participates in the General Assembly of the WUO and meeting of Societies as a member of their supervisory bodies with the right to speak but not the vote
- handles complaints and suggestions submitted by WUO on O&M or management of the módulos or district.
- monitors and records water quality of both surface and groundwater as well as the physical , chemical and biological conditions of irrigated soils
- carries out such other functions that are reserved for the CNA under the applicable laws and regulations.

Water User Organizations

Under the new National Water Law, farmers wishing to form a user organization must legally incorporate themselves into a not-for-profit user organization, known as *Asociación Civil*, in order to have the legal status necessary to apply for a Title of Concession for the use of water and infrastructure of the irrigation systems, and to collect fees for irrigation service from the users. The organized users must also show satisfactory proof to the CNA that their WUO has the necessary corporate status, technical capacity and financial solvency to operate under the Title of Concession. Once these conditions have been met, the management, operation and maintenance responsibilities can transferred. Prior rehabilitation of the irrigation district or the *módulo* is not a precondition for transfer. Moreover, negotiation for rehabilitation between CNA and a WUO is treated as a separate process on a case-by-case basis.[5]

Farmers have organized themselves into WUOs at several levels (see Table 3.1). Water user organizations have been formed at the irrigation subsystem (*módulos*), district and national levels.

Table 3.1: Different Levels of Water Users Organizations

Organization	***Level***
Civil Association	*Módulos* level
Hydraulic Committee	Irrigation District level
Society of Limited Responsibility	Irrigation District level
National Association of Irrigation Users (ANUR)	National level

Módulos level

At the *módulos* level, each WUO is administered by a General Assembly (*Asamblea General*), an Executive Council (*Consejo Directivo*), and an Oversight Committee (*Consejo de Vigilancia*) (see Figure 3.5). The duties and obligations of each are presented in Box 3.2.

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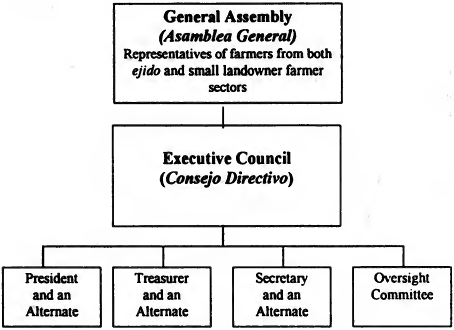
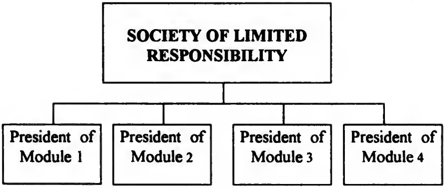
[5] In preparation for the modernization and rehabilitation process, the CNA has developed *Guidelines for Modernization of Irrigation Districts* with assistance from the World Bank and the International Program for Technology Research in Irrigation and Drainage (IPTRID).

Figure 3.5: Typical Oraganization of a Water User Organization

At the level of the *modulo*:


General Assembly
(Asamblea General)
Representatives of farmers from both ejido and small landowner farmer sectors
Executive Council
(Consejo Directivo)
President and an Alternate
Treasurer and an Alternate
Secretary and an Alternate
Oversight Committee

At the level of the irrigation district:



The **General Assembly** (of farmer representatives) is the highest governing executive body of the WUO. The membership of the General Assembly is comprised of user representatives or delegates of both the *ejido* and the "small" landowner farmers. The two groups of farmers first reach agreement on the number of delegates that will be allowed for each group. The rules dictating the election of the delegates are decided upon by the two groups of users, thus the rules vary from one irrigation district to another. However, there are four options:

- One Delegate per *ejido* and one per small landowner group.
- Two Delegates per *ejido* and two per small landowner group.
- One Delegate per 100 *ejido* farmers.
- Two Delegates per irrigation section, one representing the *ejido* farmers and one representing the small landowners.

The operations of the General Assembly are based on meetings held by the *ejido* and small landowner groups in which representatives of each group are elected to the Executive Council and to the Oversight Committee of the WUO. The primary objective of the General Assembly is to elect and remove members of the Executive Council and Oversight Committee of the WUO.

Executive Council of each WUO includes the following officers and alternates: a president, an administration secretary, a treasurer, and a technical secretary. Two representatives, and their alternates, each from the ejido and the small landowner sectors will hold office in the Executive Council in each term and will alternate posts with each term. The positions in the Executive Council are honorary and are not compensated. The term of office is typically two or three years, depending on the bylaws of the WUO.

The **Oversight Committee** is comprised of a commissioner, who serves as an inspector and auditor, one from each of the groups of *ejido* farmers and the small landowner farmers and from the district office of the CNA and the state government.

Box 3.2: Rights and Obligations of the WUO

The **General Assembly** :

- selects the Executive Council
- studies and either approves or rejects irrigation programs submitted by the Executive Council
- studies and approves or rejects plans relating to maintenance and development of infrastructure submitted by the Executive Council
- studies and approves or rejects proposals concerning the water service fees submitted by the Executive Council
- considers and rules on irregularities in the administration, O&M or service to users, reported by the Oversight Committee or submitted by individual users of the ***módulos***
- studies and either approves or rejects draft agreements with the government or private sector institutions which have been submitted by the Executive Council and which the Executive Council proposes to sign.

The duties of the **Executive Council** are to:

- administer and direct the affairs and resources of the WUO
- agree, sign, amend, renew and rescind contracts and agreements entered into in accordance with the corporate purpose of the WUO
- lawfully acquire immovable and movable property needed to carry out the purposes of the WUO
- convey or encumber immovable and movable goods owned by the WUO
- represent the WUO before all public administrative, judicial or labor authorities, whether at the federal, state or municipal level
- oversee all matters relating to the powers, duties and remuneration paid to administrative and technical staff in order not to exceed the expenditures budget approved by the General Assembly
- carry out the resolutions adopted by the General Assembly
- ensure that the O&M and administration of the WUO are in accordance with authorized agricultural planning
- forward to the CNA for its information and /or approval the operating and maintenance budgets of the WUO, along with its expenditure budget and schedule of rates as approved by the General Assembly
- determine culvert service for irrigation ditches and drains
- issue calls for tenders and official correspondence on behalf of the General Assembly and the Civil Association
- submit a detailed account to the General Assembly at least once annually reporting on the current operation of the Civil Association.

The duties of the **Oversight Committee** are to:

- inspect the accounting records, assets, inventory and reconciliation of bank accounts of the Civil Association at a minimum of once per month
- order an audit of accounting and administrative records when instructed to do so by the General Assembly
- attend meeting of the Executive Council with the right to speak but not vote
- place before the General Assembly any petition signed by at least 50% plus 1 of the farmers registered in the ***módulos***
- authorize and determine the procedure for replacing members of the Executive Council during temporary absences, in accordance with the guidelines specified in the Instructions for the Operation, Maintenance and Administration of the Civil Association
- take part in discussions and vote on the approval of the annual budget for O&M, administration and rehabilitation submitted by the Executive Council.

Irrigation districts level

The National Water Law mandates that, the highest decision-making body at the level of the irrigation district is the Hydraulic Committee comprised of representatives from all the WUOs in the district. The Hydraulic Committee is organized and operated in accordance with the regulations governing the district and acts as a "collegiate" body to coordinate the proper management of the water and infrastructure of the irrigation district. The Committee proposes a set of rules or bylaws for the district and supervises their implementation. These rules should not contradict the Title of Concession and must be submitted to the CNA for authorization.

The membership of the Hydraulic Committee consists of a President, that is the Chief Engineer of the Irrigation District and attached to the irrigation district office of the CNA, and a representative from each of the WUOs that make up the irrigation district. Box 3.3 presents the duties and obligations of the Hydraulic Committee.

Box 3.3: Rights and Obligations at the District Level

The Hydraulic Committee is responsible for the following:

- propose to the CNA for its approval the regulations of the district
- hold ordinary sessions at least once every month and hold extraordinary sessions in those cases specified by the regulations of the district
- know the plans of the irrigation district and be informed of its progress
- promote studies and programs to improve the rational exploitation and use of water, as well as the conservation and improvement of the soils and the infrastructure works of the irrigation district
- promote the resolution of disputes that may arise among the users within a ***módulos*** or among WUOs resulting from internal operation
- know and follow-up on the programs of maintenance and improvement of works on the hydraulic infrastructure of the irrigation district
- know and give opinion on the determination and the manner of collection of water fees that the users must pay for the administration, operation, conservation, maintenance and supervision of the district as a whole, and for the cost recovery of investment in infrastructure works
- know and promote programs of training and technical support of the CNA to the users or their WUOs.

In only five irrigation districts (420,000 hectares), have the WUOs decided to establish an SRL and complete the turnover process through Stage 2. The Presidents of each WUO represent their WUO in the SRL. The SRL does not have any decision-making power. The primary reason for establishing an SRL is to decrease the cost of operation and maintenance for the WUOs in the irrigation district. The establishment of a SRL permits greater economies of scale in the use of maintenance machinery and equipment, purchased by the WUOs or turned over to the WUOs at the time of transfer, and thereby reduces the cost of maintenance and operation for all farmers in the district. However, there is a cost involved in the formation of the SRL. The individual WUOs in the district must pay the SRL for maintaining and operating the main irrigation and drainage systems and the corresponding infrastructure and roads. Therefore, for a SRL to be attractive to farmers, the savings from pooling equipment, machinery and resources must be greater than the payments that each WUO must make to the SRL.

In Mexico, Although experience is limited so far, some interesting remarks can be mentioned:

- There is still no evidence that the SRLs are achieving lower maintenance costs.

- If not strictly supervised, the SRL may soon become an enormous apparatus in which the efficiency of services may be jeopardized.
- At least in one case (Yaqui River Irrigation District), the SRL was born with a 'political" component: the WUOs were so small that they decided to appoint the SRL as their representative in regard to all matters concerning the Concession. This has proved unfortunate, because now the irrigation districts authorities keep struggling with the SRL to get compliance with the obligations stated in its Permit.

National level

At the national level, the WUOs have organized themselves into the National Association of Irrigation Users—*Asociacion Nacional de Usuarios de Riego (ANUR)*—a national organization of water users. In August 1994, a national organization with the 310 WUO was officially established. The national WUO is a national coordinating body and provides a forum for discussion. As yet, it does not have any decision-making power .

CHAPTER IV

FINANCIAL ARRANGEMENTS

Introduction

With the transfer of irrigation districts to WUOs, the financial responsibilities are shared by the government and the users. Prior to the transfer, the farmers received subsidies for the cost of water and more than 75 percent of the O&M and energy costs were subsidized by the government (Cumming and Nercissiantz, 1994). They were not required to repay the capital costs associated with new water projects. However, with the transfer of O&M and administration of the secondary systems to WUOs, the users are now required to pay the costs incurred in the operation, maintenance and administration of the irrigation system.

Cost of Operation and Maintenance

Provisions regarding cost of O&M of irrigation district are found in Mexico's Federal Law of Rights (*Ley Federal de Derechos*), the National Water Law, and the Rural Districts Law (*Ley de Distritos de Desarrollo Rural*).

Water fees are determined in a collaborative process between the CNA and the WUOs. First, the CNA formulates its budget, including the costs of operation, maintenance and administration of the storage reservoir, the headworks, the main system, irrigation and drainage engineering, and supervision. The cost of bulk water delivery also takes into account the total available volume of water to be distributed among the *módulos* and the conveyance efficiencies of the irrigation district. This cost is then divided proportionately among the *módulos* in the irrigation district as a function of each *módulo*'s surface area.

If an SRL exists in the irrigation district, the SRL calculates the costs of operating, maintaining and administering the main canal and main drainage and the cost of bulk water delivery from the CNA. Then this costs is distributed proportionately among the WUOs.

The WUOs in the irrigation district determine their budgets for the coming year. The WUO budget includes the normal annual costs for operation, maintenance and administration of the secondary systems, including the distributary network, secondary drainage network and related roads and other infrastructure at the *módulos* level. The budget of the WUO also takes into consideration any improvements that the WUO may want to carry out that year and the cost of bulk water delivery from the CNA, if there is an SRL does not exist in the irrigation district. The basis of calculation of water fees is specified in the Instructions for Operation, Maintenance and Administration that accompany the Title of Concession.

In irrigation districts that are equipped with water flow measurement structures, the water fee is expressed volumetrically, in new pesos per thousand cubic meters. Otherwise, fees are expressed in area, in new pesos per ha or per irrigation, and are crop specific,

Since each WUO determines its own water fees based on its own costs of operation, maintenance, and administration, the water fees may differ from *módulo* to *módulo* within the irrigation districts. However, on average, 18-36 percent of the total water fees collected by the WUOs is paid to the CNA for O&M and administration of the headworks and the main system. In the cases where a SRL exists, on average about 10 percent is paid to the SRL for O&M and administration of the main system and 20 percent is paid to the district office of the CNA for administration of the headworks. These figures are used as a crude indicator to analyze and monitor the performance of the WUO. For example, if the WUO is using 20 percent of its budget on maintenance, the district office of the CNA will alert the WUO that too little maintenance is being carried out. Clearly, as more of the deferred maintenance is carried out, the level of spending on maintenance decreases.

Farmers must pay for water delivery prior to receiving the water. In some irrigation districts the water fee is paid by the user prior to the receipt of each irrigation, while in others it is paid prior to the beginning of the irrigation season. A recent change in the collection of water fees is to require users to pay a portion of the full cost of the irrigation service at the beginning of the cropping season prior to water delivery instead of before each irrigation. This is to ensure the financial viability of the WUO during times of rainfall surplus when demand for water delivery would decrease.

Generally, the collection of water charge is strictly enforced by the WUO. In some cases, however, farmers may be unable to pay the water fee, in which case the user may have to burrow to pay the water charges or some arrangement must be made between the user and the WUO, whereby the farmer pays the water bill when the crop is harvested. This is not a preferred option for the WUO, since the organization would rather have the money earlier rather than later. There could be liquidity problems if many farmers opted for later payments. The Concession agreement between the CNA and the WUO transferring management responsibility specifies actions to be taken against users who default on payment of water fees.

Capital Costs

Provisions regarding cost recovery of capital investment in public works are found in the Federal Law of Contribution to Improvements for Hydraulic Infrastructure (*Ley de Contribucion de Mejoras para Obras Publicas Federales de Infraestructura Hidraulica*). Beneficiaries are required to pay up to 90 percent of the reimbursable cost of the investment. This charge is paid semi-annually or annually for up to 40 years and is adjusted semi-annually in accordance with the consumer price index.

Under the World Bank supported *On-Farm and Minor Irrigation Networks Project*, CNA's goal for capital cost recovery policy of minor network improvements and for on-farm improvements is 100 percent. This policy exemplifies the government's commitment to having the primary user pay for improvements that will help him improve water use efficiency and hence, reduce the bill for irrigation water. In the case where the improvements affect several farmers, all users must pay 50 percent of the cost of capital improvements. This is a departure from the traditional policy where users paid little or nothing of the capital costs of investment or improvements.

CHAPTER V

TRAINING AND COMMUNICATION PROGRAMS

Introduction

As part of the management transfer process, the CNA has implemented a series of comprehensive training and communication programs. An initial action in the transfer of an irrigation district is the promotion of the transfer among the farmers. This is carried out through a comprehensive and very elaborate communications program. After the transfer is decided and the WUO is organized, an intensive program is initiated.

The primary objective of these programs is to create a critical mass of well-educated professionals at the various levels of the irrigation districts and in different irrigation related institutions.

Training Program

The CNA has pursued a two-part program of training and capacity-building. The design and coordination of the program is under the direction of IMTA, which organized experts to develop the training content and materials to be used. IMTA has contracted the services of established training institutions and universities in Mexico to implement the training program. FAO has extended technical assistance to IMTA for this purpose.

In 1992-1993, when the first training component was implemented, secondary irrigation systems were being transferred to newly-organized WUOs, that as yet did not have any long-term experience in operation and maintenance of ***módulos*** and in coordinated water management. The training, therefore, focused on classroom and theoretical training in organization, administration and financial management of the ***módulos*** as well as cost recovery.

The second component to be implemented from 1994-1996, however, is more practical in nature, focusing on real-world operational problems and their solutions. The training deals with irrigation management, irrigation technology, and the commercial and marketing aspects of agriculture and business management, providing practical training to farmers, managers and the members of the Executive Council of the WUOs, and the technical staff of the district offices of the CNA. Using workshops, the participants prioritize the practical problems they encounter, then consider and discuss different actions that can be taken to solve the problems.

In addition to receiving training on various aspects of irrigation, canal operators and ditchriders, who have direct contact with the users, also receive training on how to effectively communicate with farmers on issues such as the establishment of water fees, operation and maintenance of both the tertiary system and on-farm systems. The operational staff must be able to transmit to the user this type of information in order to promote effective operation of the *módulos*. Accordingly, ditchriders and canal operators participate in small (20 participants) 1 day workshops that provide training on liaison and communication with farmers.

Table 5.1: Training Program

Training Program	***Subject matter***	***Participants***	***Length of Courses***	***Number of Participants***
1992-1993	Technical training in O&M and administration of the *módulos*	Presidents of the Executive Council and technical staff of WUOs	2-3 days	About 30 in each course
1994-1998	Two annual courses with the purpose of upgrading existing knowledge of and introducing new irrigation concepts	Engineers and technical staff of the district office of the CNA, technical staff of WUOs and technicians	two week	250 trained in 5 years
	Six diploma courses in general irrigation, salinity and drainage, modernization of irrigation, land leveling, design and construction of small structures, and water and soil analysis	Engineers and staff of district office of the CNA, technical staff of WUOs and technicians	8 weeks for each course	475 total trained
	Courses on enterprise management, accounting, credit management and international marketing	Members of the Executive Council and managers of WUOs	20 courses of short duration held in the irrigation districts	400
	Courses on different aspects of irrigation, including water scheduling, flow control, water measurement, drainage, maintenance problem solving and communication skills	Operational staff of WUOs, including canal operators and ditchriders	series of 1 day courses	700
	Field day for farmers to promote modern on-farm technology and increase awareness of good water management practices	Farmers	1 day	7000

Source: World Bank and FAO (personal communication) (1994).

In general, the approach of the courses is to place the operation and administration of the *módulos* and the irrigation districts within the context of national agricultural production and marketing. The courses first consider the international economy and how the national economy fits within that framework; then it focuses on the *módulos* and the interdependency between the *módulos* and the national economy.

The cost of the training program is met by the IMTA and the CNA. The farmers who participate pay for the transport to the training venue, and food and lodging expenses, where necessary. The CNA pays for the course materials. It is estimated that by the time the training program is fully implemented, about 80 percent of the irrigation districts will have been covered by the training program. The qualitative impacts, however, are much more difficult to evaluate.

One of the primary issues that has emerged in the execution of the training program has been that of institutional coordination among various agencies. In several instances, the absence of strong coordination has resulted in delays in start-up time of different training components due to logistical problems in financing, organization of course material and preparation of training personnel.

Communication Program

A communication program has also been initiated in support of the transfer of irrigation districts to WUOs. The program uses different mediums of communication to help in the training process and provide information to users about irrigation technology, on-farm management, maintenance and administration of the *módulos*, marketing, etc. The material used includes a video of 10-12 minutes in length, a booklet with content of video and additional information, and a guideline booklet for the instructor.

The IMTA is responsible for planning and coordinating the program. Permanent centers of information have been established, at the regional and state offices of the CNA and WUO levels. There participants, who are farmers, the technical staff of the district office of the CNA and the WUOs learn to produce, distribute and effectively use communication material.

The national WUO, ANUR, which was established in August 1994, became a partner in the communication program with IMTA. The national WUO plans to establish its own department of communication and information financed by the fees received from the WUOs.

Public information and awareness programs through mass media have had a define role in promoting the concept that water is not a free good, but is in fact an economic resource. The communication program emphasizes the notion that water is a valuable resource, and that everyone needs to contribute to its proper use and conservation.

An issue that has emerged in the implementation of the communication program is the preparation of technical material. For example, production of communication material dealing with the National Water Law is relatively straight forward. But preparation of material dealing with technical issues, such as irrigation system design or control structures, may be more contentious due to the options available and the varying views of the experts involved in preparing the material.

CHAPTER VI

CONCLUSION

Status of the Transfer Program

The CNA has recently completed an administrative assessment of the transfer process to review the requirements for effective formation of WUO. The assessment included the review of documentation supporting the transfer of the hydraulic infrastructure and machinery to WUOs and the operation and administration of 208 WUOs in 34 completely transferred irrigation districts, comprising almost 1.9 million ha and 226,112 users as well as 4 Societies of Limited Responsibility. The study also included 85 WUOs in 16 partially transferred irrigation districts, comprising 521,597 ha and 80,497 users.

This review was an assessment of the documentation and procedures necessary for the WUO to effectively operated and maintain a *módulo*. Modifications are being implemented in light of the findings of the assessment.

During the period 1995-2000, the CNA has planned to complete the transfer program in the 16 partially transferred irrigation districts and continue the transfer process in 26 irrigation districts yet to be transferred. Greater emphasis of implementation of the transfer program will be placed in the Northeast region (where 68 percent of the area is yet to be transferred), the Valley of Mexico (63 percent) and the Southeast region of the country (with almost 88 percent of the area is planned to be transferred to WUO).

An assessment has also been carried out by the Colegio de Postgraduados, Mexico, of four irrigation districts: No. 38 Río Mayo, Sonora, No. 5 Delicias, Chihuahua, No. 94 Jalisco Sur, Jalisco, and No. 10 Culiacán, Sinaloa (Colegio de Postgraduados, 1994). The assessment, which consisted of a survey of Executive Council members and samples of farmers in the four irrigation districts, considered water management, economic, and social factors, including:

- the characteristics of the users, their land and agricultural production;
- management and distribution of irrigation water;
- maintenance of the infrastructure in the irrigation district, the *módulo*, and on-farm, including on-farm improvements;
- water fees and finances of the WUO;
- institutional coordination among WUOs organization and participation of the users in the WUO and the irrigation district

Some findings of the study are

- About 80 percent of the surveyed farmers in the four irrigation districts said that with the transfer of the district to WUOs, there were improvements in water management, and in timely and adequate water delivery and maintenance of the irrigation systems.
- About 45 percent of the farmers believed that the water fees were high.
- About 30 of the farmers had problems of salinity primarily due to inadequate drainage systems and poor on-farm water use and that although farmers were not presently doing much to rectify this situation, they did want to improve this situation through modest financial contributions.
- Most users opined that coordination between the WUO and the Society, if one exists, or the WUOs and the CNA was acceptable but some users maintained that in some cases there may be duplication of work. The majority of the users believed that the WUO was a support to production. But a small percentage of the users thought that the leaders of the WUOs were those that most benefited.
- Most of the irrigation districts have reached financial self-sufficiency, but large variations in water availability had affected revenues of the WUOs, which must endure financial difficulties in years of water shortages or heavy rainfall.
- With the transfer of the irrigation districts, conveyance efficiency increased, due to better water management by the WUOs and the users, the need to conserve water in times of water shortages, and increased reliance on groundwater.

For the most part, there was satisfaction on the part of users on taking over the responsibilities of operation, maintenance and administration of the hydraulic infrastructure. Users claimed that: irrigation service had improved: structures were being better maintained even though they needed rehabilitation; there was interest in improving the on-farm irrigation systems, in improving the technological level of water distribution; and in technical assistance to users. The users greatly appreciated the training and technical assistance provided the CNA and IMTA.

The transfer of the four irrigation districts to the WUOs led to reductions in the number of staff causing dissatisfaction among the CNA personnel. Some employees were compensated with packages while others were relocated.

The assessment by the Colegio de Postgraduados reached several conclusions:

- At the time of irrigation district transfer and the formation of WUO, the number of WUO formed in a given irrigation district should be minimized to reduce the costs of administration

- In order to improve O&M of the systems and to lower the chance of possible conflicts due to lack of coordination between the WUOs and the SRL, the WUO should assume the responsibilities of operation and maintenance of the structures, instead leaving the work to the SRL. From what has been observed, the WUOs can give a better service to their users and be more in touch with their needs.

- The Societies should be more dependent on the WUO, which in turn requires that those that make up the Executive Council of the SRL be drawn from the Executive Councils of the WUOs.
- The working and technical staff of the WUO should participate in training programs in order to be able to better do their jobs. Also, it may be advisable that the engineers in charge of the water distribution should receive training in water management at the level of the parcel, in order to be able to give technical assistance to the users.
- Better coordination between the technical staff and the Executive Council of the WUO and the staff of the CNA and the SARH is needed to carry out the work of the Hydraulic Committee to ensure equitable distribution of water resources among all users.
- The WUO should form an amortization fund for renovation and replacement of equipment and machinery.

Lessons Learned

Implementation of a reform program of this magnitude requires ***strong government commitment*** of the top political leadership and policy managers. Mexico was fortunate to have the commitment of both the levels of leadership as the President and his cabinet took the lead in a sustained program of privatization in all spheres of the economy. This commitment sent a strong signal of support for reform down to the district level. It also made possible the ***establishment of the sound legal and institutional frameworks*** to enable and facilitate the management transfer of ID to WUO to take place.

The transfer of ID has meant an ***adjustments to new roles by both farmers and the government irrigation agency***. The new role of CNA—as elaborated earlier—is that of providing guidance and technical support to users' organizations and monitoring the use of the nation's water resources. The agency oversees the process of decentralization and the transfer of irrigation districts to the WUOs. The CNA, through its local irrigation districts offices, makes certain that: the transfer is sustainable; water fees are sufficient to ensure cost recovery; investments are being made; and appropriate maintenance is being carried out. Moreover, it monitors water and soil quality and the effluent level, to prevent excessive pollution. In its supervisory role, the CNA also provides WUOs with technical assistance.

The new role required adjustments within the CNA. One of the most difficult tasks in initiating the transfer process was to attain cooperation from the various staff levels in

CNA. Some did not agree with the policy of transferring the O&M of irrigation districts to WUOs. Of these staff, some were persuaded through discussions, some left for other employment, or sought early retirement.

Likewise, farmers also have had to adjust their roles In many ways, farmers have gained greater power and control over water distribution through the transfer process. However, some who had previously enjoyed a degree of power or leadership, found that their position within the political power structure was changing. An example of this adjustment process is found in the transformation of what used to be the Directive Committee into the Hydraulic Committee. As discussed earlier, the latter Committee is based on hydraulic areas and is thus a functional group rather than a political forum. Some emerging conflicts as a result of such a change had to be dealt with by the farmers and the CNA in the early process of WUO formation.

While the farmers have obtained a greater leverage in water management than before the transfer, they have had to ***substantially increase their contributions to O&M of the sub-system under their management and on-farm capital improvements***. Full O&M cost recovery is eventually expected from WUOs. This goal has been made more possible through user management supported by CNA ***technical assistance***, ***choice of appropriate technology for increased efficiency in maintenance***, and invaluable ***training and communication programs***. Nevertheless, there is some concern among farmers whether agricultural returns would allow them to meet this goal right away. There is also some concern among CNA staff whether the pressure on users to meet O&M costs would lead to a sacrifice of maintenance quality.

Implications for Other Countries

In some countries of Asia that pioneered user participation in water management and in O&M, the focus has been for long on (i) transferring management responsibility of small scale systems to user organizations and (ii) collecting user fees for agency managed O&M. Mexico has instead stressed turnover of large scale systems at a secondary canal level to user management. Chile, Argentina, Peru and Colombia, to name a few Latin American countries, are also transferring management functions to user organizations at a significantly higher level in the irrigation system. In this context, it is useful to point out the variability in WUOs in the developing countries (Meinzen-Dick, et al, 1994) :

> *"The first, (or "Asian model") typically relies on direct participation of all members. Base units are likely to be smaller. These are often socially-based multipurpose organizations that build upon members' daily interactions and knowledge of each other for decision-making, monitoring, and sanctioning. These are likely to be most appropriate in socially cohesive societies with smaller landholdings, low market penetration and simpler irrigation technology.*

> *The second, (or "American model") is a more specialized organization with role differentiation. The specialization, together, with less reliance on face-to-face interactions, allows for larger organizational size. Membership is more likely to be based on hydraulic boundaries, and the organizations are focused on irrigation rather than multiple activities. Formal rules and supervisory bodies form the basis for decision-making, monitoring, and sanctioning. Such organizations are appropriate to situations of larger landholdings, greater market development, and more complex technology."*

Together, by the end of this century, significant experience on the Asian and American models and their variations should be available. There is great potential for lessons of public-private management partnership. Hence the need for careful documentation, review, monitoring and research. In particular, legal, financial and organizational aspects of WUOs, incentives for agencies and farmers, means of sustaining WUOs are topics that require systematic attention.

Progress on the formation and strengthening of WUOs can be reviewed against the benchmarks for successful transfer identified by the International Irrigation Management Institute (Vermilion, D., 1994). The benchmarks or "vital elements" proposed are:

- a clear and sustainable water right;
- irrigation infrastructure which is compatible with the water right and local management capacities;
- adequate financial and human resources for management; and
- supportive accountability and incentives for managing entities.

The sustainability of the WUOs and the new arrangements would have to be assessed against these measures as the transfer program continues in Mexico. Clearly, it is too early to judge the sustainability of the Mexican program and what its long-term efficiency, equity, financial and environmental impacts may be. But it is certain that irrigation management, dominated by a government-built system and government-operated services, as the Mexicans had known it until 1988, is not sustainable and is unlikely to be revived. The present reform program makes a radical departure from past practice. Its short-term effects are noteworthy. Its long-term impacts will have to be carefully monitored.

Annex 1

National Water Law

December 1992

National Water Commission

SARH

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FOREWORD

The National Water Law is part of the Government's modernization, planning and programming for the efficient and rational use of Mexico's natural water resources, and continues a legislative tradition that began with the Irrigation Law promulgated in 1926. This text replaces the Federal Water Law of 1972.

The legislative framework is based on Article 27 of the Constitution of the United Mexican States and, above all, reflects sovereignty of the nation over water, as well as its inalienable and vital nature.

It is moreover consistent with the sweeping constitutional reforms promoted by the Federal Executive Branch with a view to bringing greater liberty and justice to Mexican rural dwellers and fostering modernization of the rural areas.

It is furthermore consistent with the latest currents of thought, in which a primary goal is efficient use of natural resourcesÄamong them waterÄas well as safeguarding of their quality and quantity.

The objectives include overall water management, with greater involvement of users, improved water resource programming and the National Water Commission as the single federal authority responsible for water management.

Owing to its transcendent importance, the National Water Commission has made this version available so that it can be disseminated and implemented.

Dr. Fernando J. González Villarreal
Director General

TITLE ONE

PRELIMINARY PROVISIONS

Sole Chapter

Article 1. This Law is pursuant to Article 27 of the Constitution of the United Mexican States as regards national waters and shall be observed throughout the national territory. Its provisions are of a public nature and in the social interest, and its objective is to regulate the exploitation, use or development of said waters, their distribution and control, as well as the protection of their quantity and quality with a view to their comprehensive and sustainable development.

Article 2. The provisions hereof are applicable to all national waters, whether surface or underground, as well as the national assets as indicated herein.

Article 3. For the purposes hereof, the following definitions shall be understood:

I. "National waters": the waters owned by the nation, in accordance with Article 27(5) of the Constitution of the United Mexican States;

II. "Aquifer": any geologic formation giving rise to the circulation or storage of groundwater that can be extracted for exploitation, use or development;

III. "Bed of a watercourse": the natural or artificial channel that has the necessary capacity for allowing the ordinary maximum high waters to flow without flooding. When the currents are subject to overflow, the natural channel shall be understood to be the bed, whenever no water control works have been built;

IV. "Hydrological basin": the territory where the waters flow into the sea through a network of river beds that converge into a main one, or the territory in which the waters form an autonomous system distinct from others, even though they do not flow into the sea. Together with its aquifers, the basin constitutes the basic unit for water management purposes;

V. "The Commission": The National Water Commission, a decentralized administrative body under the Secretariat of Agriculture and Water Resources (Secretaria de Agricultura y Recursos HidráulicosÄSARH);

VI. "Standards": official Mexican standards issued by the Commission in accordance with the Federal Measures and Standards Act referring to the conservation, security and quality of national waters and the national assets referred to in Article 113;

VII. "Individual or body corporate": individuals, *ejidos*, communities, associations, companies and other bodies corporate recognized as having legal status by law, with the forms and limitations established by it;

VIII. "Bank or federal zone": strips of land 10 m wide contiguous to the bed of watercourses or formations containing the nationally owned deposits of water, measured horizontally from the maximum ordinary water level. The breadth of the bank or federal zone shall be 5 m for river beds 5 m wide or less. Calculation of the ordinary maximum water level shall be based on the ordinary maximum crest level determined by the Commission, in accordance with the regulations hereto. For rivers, the strips shall be delimited from 100 m upstream, continuous until the point at which the waters discharge into the sea;

IX. "Water supply and sewerage system": the set of works and actions that permit the provision of public water supply services, including sanitation, understood to be the conveyance, treatment, disposal and discharge of wastewater;

X. "Consumptive use": the volume of water of a certain quality consumed in carrying out a given activity, calculated as the volume of a given quality that is extracted, minus the volume of another quality that is discharged, and which is indicated in the pertinent license;

XI. "Residential use": the use of water to satisfy the needs of households;

XII. "Lake, lagoon or estuary": the natural reservoir of national waters delimited by the height of the regular maximum crest level; and

XIII. "Buffer zone": the strip of land adjacent to dams, water control structures and related facilities, when such works are nationally owned, to the extent set in each case by the Commission for their protection and proper operation, conservation and supervision, in accordance with the regulations hereto.

TITLE TWO

WATER MANAGEMENT

CHAPTER I

General Provisions

Article 4. Authority for and management of national waters and their inherent public assets shall be the responsibility of the Federal Executive Branch, either directly or through the Commission.

Article 5. For the purposes of compliance with and implementation of this Law, the Federal Executive Branch shall promote the coordination of actions with the governments of the federative entities and municipalities, without prejudice to their powers in the matter or their corresponding authority. Likewise, it shall promote the involvement of users and private parties in the construction and administration of the water works and services.

CHAPTER II

Federal Executive Branch

Article 6. The Federal Executive Branch shall:

I. Issue decrees establishing or eliminating restrictions on national waters, in accordance with Title Five hereof;

II. Regulate the extraction and use of groundwater, including that freely extracted, as well as surface water, in accordance with Title Five hereof;

III. Establish irrigation districts when the public interest is grounds for expropriation;

IV. For reasons of public interest, issue decrees relating to the expropriation, full or partial temporary occupation of assets, or limitation on ownership rights; and

V. [Exercise] the other powers vested by law.

Article 7. The following is declared to be in the public interest:

I. The acquisition or utilization of fixed assets required for the construction, operation, maintenance, conservation, rehabilitation, improvement or development of public water works and related services, and the acquisition and use of other facilities, fixed assets and communication channels required therefor;

II. The protection, improvement and conservation of basins, aquifers, river beds, enclosed bodies of water and other nationally-owned deposits, as well as the infiltration of water to resupply water-bearing strata and the diversion of waters from one basin or water region toward others;

III. The use of national waters to generate electric energy to be used in the provision of public services;

IV. Restore the hydrological balance of national surface and underground waters, including extraction limits, restrictions, reserves and change in the use of water so that it is suitable for residential use;

V. The opening of wastewater treatment plants and implementation of measures to reuse such water, as well as the construction of works for the prevention and control of water pollution;

VI. The establishment in accordance herewith of irrigation districts or drainage units, and the acquisition of the land and other fixed assets necessary for establishing the irrigation or drainage zone;

VII. The prevention of and response to the effects of extraordinary meteorological phenomena that endanger people or installations; and

VIII. The installation of the necessary devices for measuring the quantity and quality of national waters.

CHAPTER III

National Water Commission

Article 8. The Secretary of Agriculture and Water Resources shall be empowered to:

I. Propose the country's water policy to the Federal Executive Branch;

II. Serve as chairman of the Technical Council of the Commission; and

III. Have jurisdiction in water matters as assigned specifically by legal provisions.

Article 9. The Commission shall be empowered to:

I. Exercise the powers vested in it in water matters by this Law, within the ambit of federal jurisdiction, with the exception of those to be exercised directly by the Federal Executive Branch;

II. Formulate, revise and oversee implementation of the national water program;

III. Propose the criteria and guidelines that provide unity and consistency in the actions of the Federal Government in matters regarding national waters, and ensure and monitor consistency between the respective programs and allocation of resources for their implementation;

IV. Promote and support the development of water supply and sewerage systems; sanitation, water treatment and reuse systems; irrigation, drainage and flood control and protection systems. As appropriate, contract or grant concessions for the provision of the services falling within its jurisdiction or as it may agree with third parties;

V. Administer and safeguard the national water resources and assets mentioned in Article 113, and protect and control their quality, as well as managing basins in accordance herewith;

VI. Program, study, construct, operate, conserve and maintain federal water control structures directly or through contracts or concessions with third parties, and carry out actions for the full development of the water and conservation of its quality;

VII. Issue licenses for the concessions, grants and permits referred to hereby; recognize rights and maintain a Public Registry of Water Rights;

VIII. Mediate and, as necessary, serve, at the request of users, as arbiter in resolving conflicts related to water, in accordance herewith;

IX. Promote the efficient use of water and its conservation in all phases of the hydrological cycle, and promote an awareness of water that considers this element a vital and scarce resource;

X. Exercise the fiscal powers vested as regards the administration, determination, settlement, collection, taxation and inspection of contributions and fees allocated to it or in the cases provided for by legislation, in accordance with the Federal Fiscal Code;

XI. Promote and, as necessary, carry out scientific research and development related to water and the training of human resources;

XII. Issue water standards in accordance with the Federal Measures and Standards Act;

XIII. Monitor compliance with and implementation of this Law, interpret same for administrative effects, and apply sanctions and exercise the acts of authority in this connection that are not reserved for the Federal Executive Branch;

XIV. Act with technical and administrative autonomy in managing resources allocated to it and its assets in accordance herewith, as well as with management autonomy for the complete fulfillment of its mission and the objectives and targets indicated in its programs and budget;

XV. In each case, with regard to the state-owned property referred to hereby, issue the pertinent official declaration, to be published in the *Diario Oficial de la Federación*; and

XVI. Carry out all other functions indicated by legislation or regulations.

Article 10. The Commission shall have a Technical Council composed of the Federal Controller and the Secretaries of Finance and Public Credit; Social Development; Energy, Mines and Para-Public Industry; Agriculture and Water Resources, who shall be the chair; Health and Fisheries. For each titular representative the necessary alternates shall be appointed.

When it considers appropriate, the Council may invite to its sessions the heads of other federal departments and agencies, and representatives of the federative bodies, municipalities and users.

Article 11. The Technical Council shall be empowered to:

I. Review and approve policies and measures permitting programming and coordinated action between federal agencies involved in water affairs;

II. Take up matters submitted to it regarding the administration of water and the Commission's revenues, assets and resources;

III. Review the programs and budget of the Commission, oversee its implementation and review the report submitted by the Director General;

IV. Propose the terms under which the borrowed funds required by the Commission are to be negotiated and concluded;

V. Approve the establishment of basin councils; and

VI. Carry out any other activities indicated by this Law or its regulations, and those necessary for the fulfillment of its mission.

Article 12. The Director General of the Commission, who shall be appointed by the Federal Executive, shall direct and legally represent the Commission, staff its administrative units, issue its manuals, handle implementation of the approved budget vis-à-vis the proper agencies, delegate powers in areas within its jurisdiction and have any other powers conferred by legislation or regulations.

CHAPTER IV

Basin Councils

Article 13. Following a decision by its Technical Council, the Commission shall establish basin councils to coordinate and liaise with the Commission; federal, state and municipal departments and agencies; and representatives of users of the hydrological basin in question, with a view to formulating and implementing programs and actions to improve water administration, development of water infrastructure and the respective services, and the preservation of basin resources.

Within the scope of the basin councils, the Commission shall agree with the users on any temporary limitations to existing rights in the event of emergencies, extreme scarcity, over-exploitation or declaration of protected areas. In such circumstances, residential use shall have priority.

CHAPTER V

Organization and Participation of Users

Article 14. The Commission shall accredit, promote and support the organization of users to improve the development of water resources and the preservation and control of its quality, and in order to foster their involvement at the state, regional or basin level in accordance with this Law and its regulations.

TITLE THREE

WATER PROGRAMMING

Sole Chapter

Article 15. The formulation, implementation and evaluation of water programming shall include:

I. Approval by the Federal Executive Branch of the national water program;

II. Formulation and integration of specific regional, basin, state and sectoral subprograms that permit the concession or granting of rights to the exploitation, use or development of water, as well as its control and preservation;

III. The establishment and updating of the inventory of national waters and their inherent public assets, as well as the uses of the water and related infrastructure;

IV. Integration and updating of the pipeline of projects for water use and for preservation and control of its quality;

V. Classification of the bodies of water in accordance with the uses to which they are put, and formulation of water balances in terms of quantity and quality and by hydrologic basin and region;

VI. The formulation of strategies and policies for regulating water use;

VII. The promotion of mechanisms for consultation, negotiation and participation in the implementation of programs and for their funding, which permit the involvement of users and their organizations, and federal, state or municipal departments and entities; and

VIII. Water programming shall be based on the natural water replenishment levels.

The formulation, monitoring, evaluation and modification of water programming, in accordance with the Planning Act, shall be made in conjunction with the basin councils or, in their absence, the mechanisms guaranteeing user participation.

TITLE FOUR

NATIONAL WATER RIGHTS

CHAPTER I

National Waters

Article 16. National waters are those indicated in Article 27(5) of the Constitution of the United Mexican States.

The national water ownership regimen shall continue to apply even when water, through the construction of works, is rerouted from its original bed or reservoir, impeded from flowing into them or undergoes treatment.

Likewise, sewage produced by the use of nationally owned waters shall have the same status.

Article 17. Surface national waters may be freely exploited, used or developed by manual means for residential or stockraising purposes, provided that these neither are deviated from their bed nor produce a change in the quality or a significant decrease in volume, in accordance with the regulations.

No concession will be necessary for the extraction of either inland or coastal marine water, without prejudice to the provisions of the Mining Act and other legislation.

Article 18. National groundwater may be freely extracted by artificial works, except when the Federal Executive Branch, for reasons in the public interest, regulates their extraction and utilization or establishes restricted areas or reserves.

Independently of the foregoing, the exploitation, use or development of groundwater shall result in payment of the fees indicated by law. The pertinent tax returns must indicate inclusion in the Public Registry of Water Rights, in accordance herewith.

Article 19. In the event of the circumstances envisaged by Article 38, it shall be in the public interest to control the extraction and utilization of groundwater, including that freely extracted, as the Federal Executive Branch may determine, in accordance herewith.

CHAPTER II

Concessions and Grants

Article 20. In order to acquire national water rights, individuals and bodies corporate must obtain a concession from the Federal Executive Branch through the Commission, in accordance with the rules and provisions established by this Law and its regulations.

Decentralized federal, state and municipal departments or agencies may acquire national water rights through a grant from the Commission.

The granting of water rights referred to above shall be governed by the same provisions as apply to concessions, and the grantee shall be considered a concession holder for the purposes hereof.

Article 21. The application for a concession must contain:

I. Name and address of applicant;

II. Basin, region and locality to which the application refers;

III. The site from which national water is to be extracted;

IV. The volume of consumption required;

V. The initial use to which the water will be put, without prejudice to the second paragraph of Article 25;

VI. The point of discharge, with the quantity and quality conditions;

VII. The project of the works to be carried out or features of existing works for the extraction and use of the water, as well as those for discharge; and

VIII. The period for which the concession is sought.

Article 22. The Commission shall respond to applications within a period not to exceed 90 working days from the date on which they are submitted in proper form.

The issuance of concessions and grants shall be subject to the provisions of this Law and its regulations and shall take into account the availability of water in accordance with water resource programming, water rights and the Registry referred to in Chapter IV of this Title, as well as any existing restricted areas or reserves.

In the issuance of grants:

I. The Commission may decide to award certain waters on the basis of bidding, when various competing interests are anticipated;

II. When water is not reserved in accordance with (I) above, the Commission may award the concession to the first applicant. If various applicants come forward simultaneously, the Commission may select the application that offers the best terms and conditions.

For the purposes of this Article, the Commission shall publish the availability of national waters in accordance with the regulations by basin, region or locality.

Article 23. The instrument of concessions granted by the Commission must contain at least the same data as indicated in Article 21 above.

The pertinent license of concession or grant for the exploitation, use or development of surface national waters shall further authorize the construction of the necessary works that may affect the hydraulic or hydrological regimen of nationally owned beds or closed water formations or the corresponding federal zones, and, if requested, the exploitation, use or development of said beds, closed formations or zones.

Article 24. Concessions and grants of national water rights shall be issued for no less than 5 or more than 50 years.

Such concessions or grants in accordance with Article 22 above may be extended for like periods as initially granted if their holders have not exercised the causes for termination envisaged herein and so request within the five years prior to expiry.

Until such time as requests for extensions of concessions or grants are resolved, the licenses issued in connection with them shall remain valid.

Article 25. Once a concession or grant has been issued, the concession holder or grantee shall have the right to exploit, use or develop the national waters for the duration of the concession or grant, in accordance with this Law and its regulations.

When the consumptive use specified in the pertinent authorization is not altered, the concession holder or grantee may change the use of the water to which rights were ceded or granted, having first notified the Commission for the purposes of revising or amending the pertinent discharge permit and making the appropriate changes in the Public Registry of Water Rights. Otherwise, this shall require the prior authorization of the Commission.

The rights of concession holders or grantees may be assigned only for the causes established herein, duly justified and substantiated.

Article 26. The concession or granting of national waters for utilization or development, independent of the application of applicable sanctions shall be suspended when:

I. The concession holder or grantee does not make the payments required by law for the exploitation, use or development of the water or for the services involved in its supply, until such time as the situation is remedied;

II. The concession holder or grantee refuses to allow the inspection, measurement or verification of the resources and water infrastructure that has been ceded or granted, until such time as the situation is remedied; and

III. The concession holder or grantee does not comply with the terms of the concession or grant, for proven cause imputable to it, until such time as the situation is remedied.

In any event, the concession holder or grantee shall be given no more than 15 working days to remedy the situation, before the pertinent suspension is applied.

Article 27. The concession or granting of rights for the exploitation, use or development of national waters may be terminated only by:

I. Expiration of the period specified in the license of concession, except when extended in accordance with Article 24 or the rights have been relinquished;

II. Revocation on the grounds of nonperformance, in the following cases:

  (a) Use of water in greater volumes than authorized, when for the same cause the beneficiary's rights were previously suspended;

  (b) Failure to pay the fees or amounts established by tax legislation for the exploitation, use or development of national water or for services related to its supply, when for the same cause the beneficiary's rights were previously suspended;

(c) Nonperformance of authorized works for the development of water and control of its quality, in accordance with the terms and conditions set by this Law and its regulations;

(d) Assignment of concession rights in violation herewith; or

(e) Noncompliance with the provisions of this Law regarding the exploitation, use or development of national water or the preservation and control of its quality, when for the same cause the offender had acted in such a manner as to have caused the prior application of a sanction subsequent to a definitive ruling, in accordance with Article 120(II and III).

III. Forfeiture declared by the Commission, when the national waters have not been exploited, used or developed for three consecutive years;

IV. Redemption of the concession or grant for reasons in the public interest, through the payment of an indemnity, the amount of which shall be set by experts, in accordance with the General Act Governing National Assets; or

V. A ruling by the courts.

CHAPTER III

Rights and Obligations of Concession Holders and Grantees

Article 28. Concession holders and grantees shall be entitled to:

I. Exploit, use or develop the national waters and assets referred to in Article 113, in accordance with this Law and the pertinent instrument of authorization;

II. At its expense, carry out the works necessary for exercising the right to exploit, use or develop the water, in accordance with this Law and its regulations;

III. Obtain legal rights-of-way for the land necessary to carry out the activities involving the development of water or its removal, such as drains, pipelines and other structures established in pertinent legislation or as may be agreed;

IV. Assign their water rights, in accordance herewith;

V. Relinquish concessions or grants and the rights attached to them;

VI. Seek administrative corrections to or copies of their authorization instruments;

VII. Obtain extensions on the instruments for like periods, in accordance with Article 24 above; and

VIII. Carry out any other activities permitted by this Law and its regulations.

Article 29. Concession holders and grantees shall be obligated to:

I. Carry out the works for the exploitation, use or development of the waters in accordance with the terms and conditions established by this Law and its regulations, and to give evidence of their implementation to prevent adverse effects to third parties or to the hydraulic development of water supply or basin sources;

II. Make the payments required under current tax legislation and other applicable provisions;

III. Comply with general provisions and standards as regards hydraulic safety, ecological equilibrium and environmental protection;

IV. Operate, maintain and protect the works needed for the stability and safety of dams, control of floods and other phenomena in accordance with the requirements pertaining to hydraulic safety;

V. Allow Commission personnel to inspect the hydraulic works used to exploit, use or develop national waters, including the drilling and extraction of groundwater, and to permit the reading and verification of accuracy of meters, as well as other activities necessary to prove compliance herewith;

VI. Provide any such information and documentation requested by the Commission to verify compliance with the conditions set forth by this Law and in the concession licenses, grants or permits referred to hereby;

VII. Satisfy the requirements for efficient use of the water and ensure its reuse in accordance with official standards and specific conditions set in that regard; and

VIII. Comply with the other obligations established by this Law and its regulations.

CHAPTER IV

Public Registry of Water Rights

Article 30. The Commission shall maintain a Public Registry of Water Rights, in which shall be recorded the concessions, grants and permits referred to hereby, as well as their extensions, suspension, termination and acts and contracts relative to the total or partial assignment of the pertinent rights.

Such acts taken by the Commission shall be automatically entered; those relative to the total or partial assignment of rights, as well as any changes made to their characteristics or entitlements, shall be included at the request of the interested party, in order of submission and provided that the requirements established by the regulations hereto are satisfied.

Article 31. The certificates of inclusion in the Registry shall be a means for proving the existence, entitlement and status of the pertinent rights, and inclusion shall be a prerequisite for the assignment of rights conferred by the licenses to be legally binding vis-à-vis third parties and the Commission.

Anyone may consult the Public Registry of Water Rights and pay for certified copies of the entries and documents giving rise to them, as well as regarding the nonexistence of a registry or subsequent entry in relation to any given entry.

The Public Registry of Water Rights may amend or rectify an entry when requested by the interested party, the omission or error is verified, and the rights of third parties not be prejudiced or there is a documented consensus among legitimate parties. Claims following rejection, rectification, modification or cancellation of entries that adversely affect third parties, as well as those referring to their invalidity, shall be resolved by the Commission in accordance with the regulations.

The Commission shall take the necessary measures to ensure respect for the rights shown in the Registry.

The Registry shall be organized and operated in accordance with the regulations hereto.

Article 32. The Public Registry of Water Rights shall also include the permanent national register, by zone or region, of extraction works and releases of groundwater, in order to show the behavior of aquifers and, if appropriate, regulate the use made of them.

The Commission shall request the data from the property owners, regardless of whether the land is located within or outside of a regulated or restricted zone. The owners shall be obligated to provide such information, along with any on such drilling or extraction works as may have been carried out.

CHAPTER V

Transfer of Rights

Article 33. Transfers of licenses for the concession or granting of national water rights shall be subject to the following:

I. In the event of simple change of title holder, when the terms of the concession are not altered, the transfer shall be made via a simple notice of registration in the Public Registry of Water Rights; and

II. In the event that, in accordance with the regulations hereto, the rights of third parties may be affected or the hydrological or ecological conditions of the pertinent basins or aquifers altered or modified, prior authorization shall be required from the Commission, which may, in such an event, grant it, deny it or set forth the terms and conditions under which the requested authorization is to be granted.

Article 34. In accordance with the regulations and regional agreements by basin, federative entity, zone or locality, the Commission shall authorize transfers of rights, within a given basin or aquifer, without procedural formalities other than registration in the Public Registry of Water Rights.

Agreements under this Article shall be published in the *Diario Oficial de la Federación*.

In the event of transfer of rights referred to in this Article, the request for registration shall be made within the 15 working days following the date of signature of the transfer contract or official act. As soon as the request is submitted, in accordance with the regulations, the transfer of rights shall be effective vis-à-vis the

Commission and must be immediately registered, in order for it to become effective vis-à-vis third parties.

Article 35. The transfer of groundwater rights in restricted or regulated areas shall be agreed jointly with the transfer of ownership of the pertinent land.

If the transfer is to be made separately, this may be done in accordance with the regulations hereto In any event, the transferor and transferee of rights have the joint and several responsibility to shoulder any expenses caused by the closing of wells that are not to be used.

Article 36. When a concession or grant is transferred, the new holder shall replace the former in the rights and obligations pertaining thereto.

Article 37. Transfers in violation to this Law, independent of the revocation referred to by Article 27(IId), shall be null and void.

TITLE FIVE

REGULATED, RESTRICTED OR RESERVE AREAS

Sole Chapter

Article 38. Following the carrying out and publishing of the pertinent technical studies, the Federal Executive Branch, in accordance with Article 6 above, may regulate the extraction and utilization of national waters, and establish restricted areas or reserves in the following cases of public interest:

I. To prevent or remedy the overexploitation of aquifers;

II. To protect or restore an ecosystem;

III. To preserve sources of potable water or protect them against pollution;

IV. To preserve and control water quality; and

V. Unusual water shortage or drought.

The regulations, decrees and their amendments shall be published in the *Diario Oficial de la Federación*.

Article 39. In the regulations of national water rights referred to in Article 38 above, the Federal Executive Branch shall set the extraction and discharge volumes that may be authorized, the modalities or limitations on the rights of concession holders and grantees, as well as other special provisions required for reasons of the public interest.

Likewise, in the event of unusual drought, acute overexploitation of aquifers or similar circumstances of need or emergency owing to force majeure, the decree of the Federal Executive Branch may adopt the necessary measures in connection with national water rights.

Article 40. The decrees establishing or eliminating restricted areas shall indicate the location and delimitation of such areas, as well as the consequences and modalities.

The pertinent restriction decree must indicate:

I. A declaration of public interest;

II. The characteristics of the restriction or its elimination;

III. The conditions under which the Commission is to establish the modalities or limit extraction or discharge on a temporary or definitive basis, through the issuance of standards;

IV. The extraction volumes referred to in III above; and

V. The duration of the restriction, which may be extended should the circumstances described in Article 38 persist.

Article 41. The Federal Executive Branch may declare or abolish via decree the total or partial reserve of national waters for specific uses.

Article 42. Groundwater rights in areas regulated or restricted by the Federal Executive Branch, including those that have been freely extracted, shall require:

I. Concession or grant of water rights; and

II. Permits for drilling works carried out after the decree instituting the restrictions or regulations.

The grants or concessions shall be awarded on the basis of the annual volume of water used on average in the two years immediately preceding the pertinent decree, and recorded in the Public Registry of Water Rights.

In the event that registration is not made in said Registry, the volume declared on the tax return for the purposes of payment of federal fees for water use shall be used as a basis.

Article 43. For cases under Article 42 above, it shall be necessary to request permission from the Commission to carry out:

I. Drilling with a view to supplementing the authorized volume, if it has not been obtained once the hydraulic works are completed;

II. Well replenishment; and

III. Deepening, relocation or change in equipment for the well.

The permit shall take into account the extraction permitted under Article 40.

TITLE SIX

USES OF WATER

CHAPTER I

Public Urban Use

Article 44. National surface water and groundwater for use by state and municipal potable water and sewerage systems shall be allocated by the Commission, which shall, where pertinent, stipulate the forms in which the payments in respect of contributions, products and uses established in tax legislation shall be guaranteed, and the forms in which the resources needed to comply with these obligations shall be generated.

Grants of national waters to communities that have granted their local or state governments the right to operate their respective potable water and sewerage systems shall continue in effect, even in the event that such systems are administered by parastatals or paramunicipals or are conceded by the competent authorities to private parties.

Article 45. Municipal authorities, in conjunction with state governments under the terms of the law, are empowered to use the national water granted to them, including wastewater, from the point of its extraction or delivery by the Commission to the point of its discharge into receiving bodies that belong to the nation. The authorities may make use of such water through parastatals or concession holders, under the terms of the law.

In the event that wastewater is reused pursuant to the preceding paragraph, the rights over it recorded in the Public Registry of Water Rights shall be respected.

Article 46. The Commission may, under agreements with state or municipal governments, construct works partially or totally for the intake, storage, conveyance, treatment or potabilization of water supplies, using funds from the federal treasury or funds obtained with the guarantee of the Federal Government or some other type of federal endorsement, provided the following requisites are complied with:

I. The works must be located in more than one state or involve multiple water uses or be requested expressly by an interested party;

II. State or municipal governments, as pertinent, must participate with funds and investments in the works to be built and must obtain the necessary financing,

III. The recovery of investments must be guaranteed, in keeping with the applicable tax legislation, and the user or users of the system must undertake to administer the water systems efficiently and assure water quality;

IV. The respective states and municipalities, and the parastatals, paramunicipals or bodies corporate contracted by them, must assume the commitment to operate, conserve, maintain and rehabilitate the water infrastructure

The respective agreements shall establish the relevant commitments.

Article 47. Discharges of wastewater into national waters or infiltration of wastewater into the ground that could contaminate the subsoil or aquifers shall be subject to the provisions of Title Seven.

The Commission shall promote the use of wastewater from potable water and sewerage systems by municipalities, operators and third parties.

CHAPTER II

Agricultural Use

Section One
General Provisions

Article 48. Members of *ejidos*, communities and small property owners, *ejidos*, communities, bodies corporate and other persons who are the owners or occupiers of land devoted to crop or livestock farming or forestry, shall enjoy the right to use the national water conceded to them under the terms of this Law.

For concessions of water for irrigation, the Commission may authorize its total or partial use on lands different from those named in the concession, when the new acquirer of the rights is their owner or occupier, provided no damages are caused to third parties.

Article 49. The rights to water for use on crop or livestock farms and forest holdings may be conveyed under the terms and conditions established in this Law and its regulations.

In the case of irrigation units, districts or systems, the conveyance of water rights shall be done in compliance with the terms of the regulations issued in this regard.

Article 50. Concessions may be granted to:

I. Individuals or bodies corporate for the individual use of national waters for agricultural purposes;

II. Bodies corporate, for the purpose of managing or operating an irrigation system or for the common use of national waters for agricultural purposes.

Article 51. For the management and operation of systems and for the common use of the water referred to in subsection II above, bodies corporate must be governed by bylaws that include regulations with regard to:

I. The distribution and management of the water conceded to them, and the manner in which decisions are to be reached by the group of users;

II. The form in which the individual rights of their members or the users of the irrigation service are guaranteed and safeguarded, and the forms in which they may participate in the management and oversight of the system;

III. The form in which the infrastructure or common system is to be operated, conserved and maintained; the form in which investments are to be made in improvements; and the form in which the costs incurred are to be recovered. It shall be compulsory for the members or users to pay the requisite fees if they are to continue to receive the service or to use the water;

IV. The rights and obligations of members and users, and sanctions for failure to comply;

V. The terms and conditions under which individual rights to water use may be conveyed among the members or users of a common system;

VI. The terms and conditions under which the rights to a concession, or the use of surplus water, may be totally or partially conveyed to third parties;

VII. The procedures for dealing with complaints by members or users;

VIII. The terms and conditions to be followed in mergers, splits, dissolutions and liquidations;

IX. All other matters that stem from this Law and its regulations or are agreed upon by members or users.

Bylaws and amendments to them require a two-thirds vote in favor by a general assembly called expressly for this purpose.

Article 52. The water rights enjoyed by the members or users of the bodies corporate referred to in Article 50(II) shall be set out in detail in the list that the concession holder must keep, under the terms of the regulations referred to in the preceding article.

The list shall be public and shall constitute evidence of the existence and status of such rights, and shall be available for consultation by interested parties.

The rights recorded in the list may not be altered without providing a hearing for persons who may be affected.

The members or users named in the list are required to provide information and documentation from time to time in order to keep it up to date.

Article 53. The provisions of Articles 50 to 52 shall apply to irrigation units and districts.

In the event that *ejidos* or communities form part of the units or districts mentioned in the preceding paragraph, they shall be subject to the provisions governing them set out in this Law.

Ejidos and communities that are not included in irrigation units or districts shall be considered concession holders for the purposes of this Law, and if they have common irrigation systems or make common use of water, the provisions of Articles 51 and 52 shall apply to such systems and uses. In this case, the members of the *ejidos* or communities that use the systems or make common use of water shall draw up the respective bylaws.

Article 54. Individuals and bodies corporate who constitute an irrigation unit or district may totally or partially change the uses made of water, in keeping with the provisions of their respective bylaws.

Section Two
Ejidos and Communities

Article 55. *Ejidos* and communities shall make use of water for residential needs and for common lands in accordance with the bylaws drawn up by the *ejido* or community, pursuant to the provisions of Article 51.

If an *ejido* or community has been parcelled out into individual plots, the members of the *ejido* or community are entitled to the water needed to irrigate their respective parcels.

Under no circumstances may the assembly or the commission of an *ejido* use, dispose of or decide to make other use of water intended for parcels without the prior and express consent of the members of the *ejido* who hold title to such parcels, except in the case of water that is indispensable for residential needs.

Article 56. When the general assembly of an *ejido* decides that its members may hold full title to their parcels, the right to the use of the water required to irrigate the parcelled land shall be held to be conveyed, and the assembly shall identify the respective sources or volumes, taking account of the water rights that the members had traditionally enjoyed. If pertinent, it shall establish the necessary arrangements or rights-of-way.

The assumption of full title to *ejido* parcels implies that the member of the *ejido* or community shall use the waters as a concession holder, under the terms of this Law.

Members of *ejidos* who, under the Agrarian Law, assume full title over their parcels shall retain the right to use the water they had used in the past. The Commission shall grant the pertinent concession at the request of the interested party, with the sole requisite that the party be in possession of official proof that the parcel in question has been registered.

Article 57. When ownership of *ejido* lands that were once common has been conveyed or when the usufruct of parcels has been ceded to civil or mercantile companies or to any other corporate body, under the terms of the Agrarian Law, those who have acquired the right to use the land shall retain the accompanying water rights. The Commission, at the request of the interested party, shall grant the corresponding concession under the terms of this Law and its regulations.

Section Three
Irrigation Units

Article 58. Rural producers may freely form bodies corporate for the purpose of setting up systems to provide farm irrigation services to various users, for which purpose they may set up irrigation units under the terms of this Section

In this event, the concession of national water shall be granted to the bodies corporate formed by such users, who shall receive freely-conveyable certificates, in keeping with the regulations to this Law. Certificates shall not be compulsory in irrigation districts.

Article 59. Individuals or bodies corporate may form a corporation and set up an irrigation unit for the purposes of:

I. Building and operating its own infrastructure to provide irrigation services to its members;

II. Building irrigation works with co-investments from federal, state or municipal public resources, and taking charge of their operation, conservation and maintenance to provide irrigation services to its members;

III. Operating, conserving, maintaining and rehabilitating federal public irrigation infrastructure, whose use under concession they have applied for to the Commission.

Article 60. The licenses of concession of national waters issued by the Commission to irrigation units shall include the respective construction permit and, where pertinent, a concession to use the public properties referred to in Article 113.

The bylaws of bodies corporate and the regulations of irrigation units shall contain the requisites set forth in Article 51 of this Law, and may not contravene the terms of the respective license of concession.

Article 61. In the eventuality described in Article 59 (II), bodies corporate shall be required to pay the recoverable portion of the federal investment, as required by law, and to furnish the guarantees necessary to ensure compliance.

In the same eventuality, the Commission shall issue regulations for the construction, conservation and maintenance of the infrastructure required by the irrigation units, and may build the works partly or totally, under an agreement with the producers or where pertinent, under an agreement with the respective state or municipal governments.

Article 62. In the eventualities referred to in Article 59(II) and (III), the board of directors of the corporation shall propose operating regulations and appropriate fees to the general assembly.

The Commission may review activities and the form in which irrigation services are provided, order corrective measures or intervene in the management of the works, under the terms to be established in the operating regulations.

The operating regulations and fees, as well as any changes to them, must be approved by the Commission in order to be valid and observable.

Article 63. Irrigation units that so agree may join together to form an irrigation district.

Independently of the above, irrigation units may freely associate for the purposes of Article 14.

The requirements for irrigation districts shall apply, wherever pertinent, to irrigation units.

Section Four
Irrigation Districts

Article 64. Irrigation districts shall include the areas within their perimeter, water infrastructure, surface water and groundwater for water supplies, storage reservoirs and the installations required for their operation.

If the Federal Government has participated in the financing, construction, operation or management of the works necessary for a district to operate, the Commission, within a strict deadline, shall proceed to hand over their management and operation to the users, under the terms of this Law and its regulations.

Article 65. Irrigation districts shall be managed, operated, conserved and maintained by their users, organized under the terms of Article 51 or by persons designated by them, for which purpose the Commission shall concede the water and, if pertinent, the necessary public infrastructure, to the bodies corporate designated by the districts.

District users may acquire, in keeping with the provisions of the law, the infrastructure in an irrigation zone.

Article 66. Each irrigation district shall set up a water committee organized and operated as determined in the regulations governing each district, which shall act as a collegiate body to coordinate proper management of the water and infrastructure.

The water committee shall propose regulations for its irrigation district and oversee compliance with them Such regulations may not contravene the provisions laid down in the license of concession and shall be subject to approval by the Commission.

Irrigation service regulations shall contain the requisites set forth in Article 51.

Article 67. In the irrigation districts, rural producers shall have the right to receive water for irrigation if their names appear in the list of district users which shall be drawn up by the Commission based on the information provided by users.

Once the list has been prepared, the concession holder shall be responsible for keeping it up to date under terms of the district regulations, and it may be recorded in the Public Registry of Water Rights.

Article 68. The users of irrigation districts are required to:

I. Use the water and irrigation service in keeping with the district regulations; and

II. Pay the fees for irrigation services agreed to by the users themselves, which must cover the costs of managing and operating the service, and of conserving and maintaining the works, as a minimum. The fee schedule shall be submitted to the Commission for approval, which may object to it if it fails to cover the foregoing.

Failure to comply with this article shall be sufficient grounds to suspend irrigation services to infractors until such time as they rectify their situation.

Suspension of irrigation services for failure to pay may not be ordered during a growing season when crops are still standing.

Article 69. In growing seasons when owing to circumstances beyond control there is insufficient water to meet demand in an irrigation district, the available water shall be distributed in keeping with the terms set out in the district regulations.

Article 70. Total or partial conveyance of water rights within an association of users of an irrigation district shall be subject to the regulations governing the unit in question.

Total or partial conveyance of the right to use national waters between associations of users in the same district may be carried out in keeping with the regulations governing the district.

Total or partial conveyance of the right to use national water to individuals or bodies corporate outside a district shall require approval by the majority of the general assembly of the district's user associations, subject to the regulations to this Law.

Article 71. The organization of rural producers and the construction of the infrastructure required to establish irrigation districts shall be promoted by the Federal Executive Branch.

Notice of the establishment of an irrigation district with Federal Government financing shall be published in the *Diario Oficial de la Federación* [Official Gazette] and shall specify:

I. The water supply sources;

II. The volumes of surface water and groundwater;

III. The perimeters of the irrigation district;

IV. The perimeters of the irrigation zone or zones that make up the district;

V. The requisites for providing the irrigation service.

Article 72. In order to set up an irrigation district with Federal Government financing, the Commission shall:

I. Initiate proceedings, when necessary, to obtain whatever prohibitions are necessary for proper operation of the works;

II. Prepare a register of the land and constructions in the district;

III. Prepare a list of owners and occupiers of land and immovable property, and of the pertinent tax and commercial values;

IV. Hold the hearings, meetings and other activities provided for in this Law and its regulations for the purpose of setting up proposed irrigation zones;

V. Institute proceedings, when necessary, for expropriation by the Federal Executive Branch of the lands required to build water storage and distribution works;

VI. Inform the authorities whose mandate requires their involvement of the creation of a district, and when necessary, of the expropriations required.

Article 73. In keeping with the regulations, the Commission shall hold meetings with the potential beneficiaries of a proposed irrigation zone in a district in order to.

I Inform the beneficiaries and reach an agreement with them regarding the recovery of the federal investment in water infrastructure, under the terms of the law;

II. Invite the beneficiaries to execute the works required to create the proposed irrigation zone with their own resources;

III. Agree to set up a users organization in the irrigation zone and determine how the beneficiaries can help to address the problems of persons affected by the water infrastructure or how they can be reaccommodated.

If within one year following the date of publication of the notice of the creation of an irrigation district, the meetings mentioned in this article fail to reach an agreement to use private or community investment to construct an irrigation zone covering the entire district, the works may be built with public investment after the land necessary for the proposed irrigation zone has been expropriated.

Land may also be expropriated, if prior to the end of the year mentioned in the foregoing paragraph, potential beneficiaries holding four fifths of the area proposed for irrigation submit a request for expropriation to the Federal Executive Branch.

Article 74. Compensation for expropriated land shall be paid in cash.

At the request of parties affected by federal public works, compensation may be paid in kind, in equivalent irrigated land for each of them, under the terms of the law, with the balance of the compensation, if any, to be paid in cash.

The Commission, in coordination with the competent authorities when necessary, shall provide for and support the establishment of human settlements to compensate for property affected by the construction of works.

Article 75. Irrigation districts may:

I. Interconnect or join with one or more other irrigation districts or units, in which case the Commission shall provide the necessary support; in this event the districts shall retain their status as irrigation districts;

II. Split up into two or more irrigation units in keeping with the district regulations; in this event the Commission shall arrange for the actions and measures necessary to protect the rights of users;

III. Totally change the use made of the water, with permission from the Commission.

Section Five
Agricultural Drainage

Article 76. The Federal Executive Branch, through the Commission and with the participation of producers, shall promote and foster the establishment of drainage units in order to increase farm production.

Agreements to create drainage units shall be published in the *Diario Oficial de la Federación*. The agreements shall set out the perimeters of the unit, a description of the works, and the rights and obligations of the beneficiaries of the services deriving from such works.

Article 77. In drainage units with federal water infrastructure, the beneficiaries may organize as bodies corporate in order to operate, conserve and maintain the infrastructure on behalf of the Commission, and charge fees for such services, based on area served. They may also collect the sums determined by law for the recovery of the investment or agreements may be reached with users whereby the users undertake to cover these costs.

Sums owing for operating, conservation and maintenance services performed by the Commission directly or through third parties, and investment recovery costs, shall be treated as taxes due for collection purposes.

The Commission shall provide the necessary technical assistance for the drainage units, and may grant concessions for the use of national waters and the related public properties.

The stipulations for irrigation units shall be applicable, as pertinent, to the drainage units.

CHAPTER III

Water Use in Electric Power Generation

Article 78. Based on studies, general plans for the use of the country's water resources, and the water programming mentioned in this Law, the Commission shall, without further formalities, grant a license allocating available water to the Federal Electricity Commission, which shall specify the volume made available for electric power generation and plant cooling, and the grounds whereon it may terminate the allocation.

The Commission shall periodically program the extraction of water from each river, basin, lake, lagoon or deposit belonging to the nation, and its distribution, for the purpose of coordinating hydroelectric uses with other uses of water.

Once they have been approved by the Commission, the studies and plans produced by the Federal Electricity Commission with respect to water for electric power generation shall form part of the general plans on the use of national water resources. In turn, the water studies and plans produced by the Commission may form part of the general plans for the use of the country's electric power. The Federal Electricity Commission shall be allowed to participate in the programming performed by the Commission for water that can be used for hydroelectric purposes, under the terms of the applicable law.

Article 79. The Federal Executive Branch shall determine whether water infrastructure for the hydroelectric system is to be built by the Commission or by the Federal Electricity Commission.

The Commission may use or concede the infrastructure for which it is responsible for the purpose of generating the electricity it requires, and may also dispose of any surplus, under the terms of the applicable law.

Article 80. Individuals and bodies corporate may apply for concessions from the Commission in the event that they require the use of national water to generate electricity, under the terms of the applicable law.

Concessions are not required for the small-scale use of national water to generate electricity, under the terms of the applicable law.

Article 81. Allocations and concessions are required for the use of groundwater in the state of steam or with temperatures above eighty degrees centigrade, for geothermal power generation and other uses, if an aquifer may be affected.

CHAPTER IV

Use in Other Production Activities

Article 82. National water may be used for industry, fish farming, tourism and other production activities by individuals and bodies corporate, upon obtention of a concession from the Commission, under the terms of this Law and its regulations.

The Commission, in cooperation with the Fisheries Department, shall facilitate the development of fish farming and the necessary water concessions. It shall also support, at the request of interested parties, the use of federal water infrastructure for fish farming provided it is compatible with other uses.

Provided watercourses are not diverted and that water quality, navigation, other permissible uses, and the rights of third parties are not affected, concessions shall not be required for fish farming using floating systems in national waters.

CHAPTER V

High Water Control and Flood Protection

Article 83. The Commission, in cooperation with state and municipal governments or with individuals and bodies corporate, may build and operate, as pertinent, works to control high water and provide protection in areas prone to flooding, in addition to roads and ancillary works to allow for better use of land and the protection of populated and industrial areas, and in general, human lives and property, in keeping with the provisions of Title Eight.

The Commission, in accordance with the regulations, shall classify zones according to the risk of flooding, issue rules and recommendations, establish measures for operation, control and follow up, and use contingency funds made available for the purpose.

Article 84. The Commission shall order the operation of infrastructure to control high water, and shall take the necessary steps to monitor extreme weather phenomena, supporting or performing the required preventive actions. It shall also take the necessary steps, as recommended by its Technical Council, to assist zones suffering from emergency water situations or affected by extreme weather phenomena, in cooperation with the competent authorities.

TITLE SEVEN

PREVENTION AND CONTROL OF WATER POLLUTION

Sole Chapter

Article 85. It is in the public interest to promote and execute measures and actions to protect water quality, under the terms of the law.

Article 86. The Commission shall be responsible for:

I. Promoting, and where pertinent, building and operating federal infrastructure and the services required to preserve, conserve and improve water quality in watersheds and aquifers, in observance of the applicable official Mexican standards and individual discharge requisites, under the terms of the law;

II. Devising comprehensive water protection programs for watersheds and aquifers, taking account of existing relations between land uses and water volumes and quality;

III. Establishing and monitoring compliance with individual discharge requisites to be met by wastewater generated in federal possessions and jurisdictions, waste dumped directly into national waters or properties, and onto any land, if such discharges could contaminate the subsoil or aquifers, and in the other cases provided for in the General Act in respect of the Ecological Balance and Environmental Protection;

IV. Authorizing, when necessary, the dumping of wastewater into the sea, in coordination with the Navy Department if it originates from mobile sources or fixed sea platforms;

V. Monitoring, in cooperation with the other competent authorities, to ensure that water for human consumption conforms to the pertinent quality standards, and that wastewater is used in keeping with the water quality standards issued in this regard;

VI. Promoting or carrying out the measures necessary to prevent refuse, waste, toxic materials or substances, and sludge from wastewater treatment from polluting surface water, groundwater or the properties mentioned in Article 113;

VII. Exercising federal powers with regard to the prevention and control of water pollution, oversight and sanction, under the terms of the General Act in respect of the Ecological Balance and Environmental Protection, unless such authority devolves on a different government agency under the Federal Public Administration Act.

Article 87. The Commission shall determine the parameters to be complied with by discharges, the assimilation and dilution capacity of national bodies of water, and the amounts of pollutants they are able to tolerate, quality objectives and the timetables for attaining them, which it shall set out in declarations classifying national bodies of water, which, for the purposes of compliance, shall be published in the *Diario Oficial de la Federación*, as shall amendments to them.

The declarations shall contain the following information:

I. The boundaries of the classified body of water;

II. The parameters to be complied with by discharges into the classified body of water, subject to the periods specified in the regulations to this Law;

III. The capacity of the classified body of water to dilute and assimilate pollutants;

IV. The maximum discharge limits for analyzed pollutants, which form the basis for setting the individual requisites for discharges.

Article 88. Individuals and bodies corporate require permission from the Commission to regularly, intermittently or exceptionally discharge wastewater into receiving bodies that are national waters and other national properties, including the sea, and for discharges that may infiltrate public land or other land if there is a risk that it may contaminate the subsoil or aquifers.

The Commission, under general agreements applicable to watersheds, aquifers, zones, localities and uses, may replace the requirement to obtain a permit to discharge wastewater with the requirement to give a simple notice.

The municipalities are responsible for discharges of sewage into municipal drainage or sewerage systems, in conjunction with state governments in cases where this is necessary or is determined by law.

Article 89. In issuing permits, the Commission shall take into consideration the classification of national bodies of water mentioned in Article 87, the pertinent official Mexican standards, and the individual requisites that discharges must comply with.

The Commission shall respond to applications for discharge permits submitted under the terms of the regulations, within the 60 working days following their admittance. Should it not reply within that period, and provided that the application is in good order, the applicant may make the discharge in the terms requested. However, the Commission may issue a discharge permit which the applicant must comply with in the event it considers that individual discharge requisites must be set or that different requisites from those appearing in the application are necessary.

When the dumping or discharge of wastewater affects or may affect potable water sources or public health, the Commission shall inform the competent authorities and refuse to issue or immediately rescind a permit, and where necessary, it shall order water supplies to be cut off until the risk has ended.

Article 90. The Commission, in keeping with the regulations, shall issue permits to discharge wastewater, which shall specify as a minimum the location of the discharge, and describe its volume and type, the procedures that are to be followed to prevent or control water pollution, and the duration of the permit.

Permits for discharges of wastewater occasioned by the use of national waters shall have at least the same duration as the licenses under which water rights were conceded or allocated, and shall be subject to the same rules that apply with regard to the extension or termination of such licenses.

Discharge permits may be conveyed under the terms of Chapter V, Title Four, provided that the requisites of the permit are honored.

Article 91. Wastewater infiltration for the purpose of recharging aquifers requires permission from the Commission, and must comply with the official Mexican standards issued in this regard.

Article 92. The Commission, within its sphere of competence, may order the suspension of activities that give rise to discharges of wastewater under the following circumstances:

I. If a permit to discharge wastewater has not been obtained under the terms of this Law;

II. If the discharges do not conform to the pertinent official Mexican standards, the individual requisites for discharge or the provisions of this Law and its regulations;

III. If payment has not been not made for the right to use public properties as receiving bodies for discharges of wastewater;

IV. If the originator of a discharge dilutes the wastewater in an attempt to comply with the respective official Mexican standards or the individual requisites for a discharge.

Suspensions shall not preclude any civil, criminal or administrative liability incurred.

Notwithstanding the above, if there is risk of damage or danger to humans or ecosystems, the Commission, at the request of the competent authority, may undertake the actions and works necessary to prevent such risks, the cost of which is to be borne by the party responsible.

Article 93. The following are grounds for rescinding a permit for the discharge of wastewater:

I. Discharging in a place other than that authorized by the Commission;

II. Performing the acts or making the omissions set out in Article 92, subsections II, III or IV, if the Commission had previously suspended the activities of the permit holder on the same grounds;

III. If the concession or grant of national waters has been revoked on the grounds that wastewater discharges are caused solely as the result of the use of said waters.

When revocation is called for, the Commission, after hearing the interested party, shall issue and give notice of its decision, which shall be duly justified and reasoned.

Permits to discharge wastewater shall expire when, under the terms of this Law, the license for the concession or grant of the national water rights that give origin to the discharge expires.

Article 94. If a discharge threatens to incapacitate a wastewater treatment plant and could cause serious harm to public health or safety or serious damage to the ecosystem, the Commission, at the request of the competent authority, and for reasons of public interest, shall order the suspension of the activity that gave rise to the discharge. In the event that this should be impossible or inadvisable, it shall appoint an administrator to take temporary charge of the management and operation of the wastewater treatment plant until such time as the activity is suspended or the danger posed by the discharge has ended.

The costs of such administration shall be borne by the holder or holders of the discharge permit.

In the event the costs are not paid within the 15 working days following the date on which they are demanded by the Commission, the costs shall be treated as taxes due for recovery purposes.

Article 95. The Commission, in areas of federal responsibility, shall inspect or monitor discharges of wastewater to ensure they comply with the law. The results of such inspections shall be recorded in a document that shall be usable for legal purposes and may serve as grounds for the Commission or other competent Federal Government entities to apply the sanctions provided for by law.

Article 96. In irrigation zones and in zones subject to disseminated or disperse contamination, substances that may pollute national surface water or groundwater must be handled and applied in compliance with the standards, conditions and provisions of this Law and its regulations.

The Commission shall promote, within its sphere of authority, the rules and regulations required to make land use compatible with water use, for the purpose of preserving water quality in an ecosystem, watershed or aquifer.

TITLE EIGHT

INVESTMENTS IN WATER INFRASTRUCTURE

CHAPTER I

General Provisions

Article 97. The users of national water may themselves build or cause third parties to build whatever infrastructure they require for water use.

Users or associations of users created for this purpose shall be responsible for managing and operating such works, regardless of the use made of national waters.

Article 98. Permits shall be required under the terms of Articles 23 and 42 of this Law and its regulations in the event that works of this kind could affect the hydraulic or hydrological regimen of national watercourses or basins or adjacent federal zones, and for wells to be drilled in regulated or restricted zones.

In these cases, the Commission may issue official Mexican standards or standards requested by users. It shall also supervise construction of the works, and may at any time take the corrective measures necessary to ensure compliance with the permits and the standards.

Article 99. At the request of investors, concession holders or grantees, the Commission shall provide support and technical assistance for the proper construction, operation, conservation, improvement and modernization of water infrastructure and services to operate it.

The Commission shall also provide the support and technical assistance requested of it for the proper operation, improvement and modernization of water services for self-sustained development under specific programs that include effective water and land management and conservation, in cooperation with users organizations.

Article 100. The Commission shall establish standards or take the steps necessary to prevent the construction or operation of a work from adversely altering the hydraulic condition of a watercourse or endangering human lives or property.

Article 101. The Commission shall itself or through third parties construct federal public water infrastructure under the investment programs for which it is responsible, in keeping with the law and its regulations. Upon request, it may also build works that are totally or partially financed with resources that do not come from the Federal Government.

In the event that an investment is made totally or partially with federal resources or that infrastructure is built with government-backed loans, the Commission, within its sphere of competence, shall establish standards, characteristics and requisites for its execution and supervision, unless by law a different department or agency is responsible.

CHAPTER II

Private and Community Investment in Federal Water Infrastructure

Article 102. It is in the public interest to promote and foster participation by private parties in the financing, construction and operation of federal water infrastructure, and in the provision of related services.

Accordingly, the Commission may:

I. Enter into contracts for public works and services with private parties, with provision for investment recovery, for the construction, equipping and operation of federal water infrastructure. A private company may be given full responsibility for a work and its operation, under the terms of the regulations;

II. Grant total or partial concessions to operate, conserve, maintain, rehabilitate or expand the water infrastructure built by the Federal Government and to provide related services;

III. Grant total or partial concessions to build, equip and operate federal water infrastructure and to provide related services.

The pertinent provisions of this Law and its regulations regarding concessions for water use shall apply with regard to the processing, duration, regulation and termination of the concessions referred to in subsection II above. The users of the infrastructure shall be given preference when such concessions are granted.

Article 103. The concessions referred to in Article 102(III) shall be subject to the provisions of this chapter and the regulations.

The Commission shall set the minimum conditions for participating in competitive bidding to obtain the concessions referred to in this chapter, under the terms of this Law and its regulations. The bidder proposing the lowest rates that conform to the criteria of seriousness, reliability and quality established in the bidding conditions issued by the Commission in each case shall be selected.

The rights and obligations of concession holders shall be established in the respective regulations or license of concession.

Article 104. In keeping with the bidding conditions issued by the Commission, the lowest rates referred to in the preceding article must:

I. Favor the efficient use of water and the rationalization of consumption patterns, and when pertinent, discourage activities that make excessive demands on water;

II. Provide for adjustments in function of variable costs, in keeping with the known and measurable indicators established in the bidding conditions;

III. Cover a fixed period, which shall never be less than the period required for capital recovery or the discharge of the financial obligations incurred on account of the concession.

Concessions may not last for more than 50 years.

Article 105. The Commission, under the terms of the regulations, may authorize concession holders to put up their rights to the concessions dealt with in this chapter as guarantees, and in that event, shall determine the terms and conditions.

The period covered by such guarantees may never extend into the final tenth of the total term of the concession.

Article 106. If during the final tenth of a concession, the concession holder fails to maintain the infrastructure in good condition, the Commission shall appoint an administrator to ensure that efficient service is provided and that the water infrastructure is not allowed to deteriorate.

Article 107. Concessions may only be terminated on the following grounds:

I. Expiry of the term established in the license or abandonment of the concession by its holder;

II. Revocation owing to noncompliance in the following cases:

   (a) Failure to execute the works that are the subject of the concession in compliance with the terms and conditions set out in the law and regulations;

(b) Failure to pay the contributions or fees established in tax legislation for the use of the infrastructure and other goods or services conceded;

(c) Conveyance of a concession or furnishing the goods under concession as guarantees without the permission of the Commission;

(d) Poor or irregular service, construction, operation, conservation or maintenance or their permanent suspension for reasons attributable to the concession holder, in the event that the consequences cause or may cause serious damages or injury to users or third parties;

III. Buyback of the concession on the grounds of public utility or interest, through the payment of compensation set by experts, in keeping with the regulations. In all cases, compensation shall at least cover the portion of the investment not yet recovered and the reasonable returns agreed to in the terms of the concession;

IV. A ruling by the courts.

In the cases referred to in subsection II, the works or infrastructure that have been built, all improvements and accessions, and the goods necessary for the continuity of the service, shall be surrendered to the nation in good condition, without cost and free from all encumbrances and constraints, with the accessories and other goods necessary to continue operation or service.

Article 108. All or part of the private or community investment may be recovered by supplying water for multiple uses, include the sale of electric power under the terms of the applicable legislation.

Public water infrastructure or the goods necessary for its construction or operation may be placed in trusts established in credit institutions, in order to facilitate investment recovery through the management and operation of said works. Once the purpose of the trust has been fulfilled, the works and goods shall revert to the Federal Government; alternately, the government may divest itself of them under the terms of the applicable legislation.

CHAPTER III

Recovery of Public Investment

Article 109. Public investment in federal water infrastructure shall be recovered in the form and under the terms set out in the Law with respect to Contributions for Federal Public Water Infrastructure Improvements, by setting fees to be paid by persons who benefit directly from the use of such works.

Article 110. The operation, conservation and maintenance of the water infrastructure shall be performed at the cost of the users of the respective services. Fees shall be determined on the basis of the cost of the services, after the costs have been adjusted for economic efficiency. Consideration shall also be given to the economic efficiency and financial condition of the entity or unit that provides the service.

Article 111. In irrigation districts and irrigation and drainage units, property may be furnished as guarantees, and in the case of members of *ejidos* or communities, the rights to the use of a parcel may be furnished as guarantees, under the terms of the Agrarian Law, to ensure recovery of investments in works and the cost of the respective irrigation and drainage services.

CHAPTER IV

Charges for the Use of National Waters and National Properties

Article 112. Users shall be required to pay for the use of national waters, including groundwater, and the national properties administered by the Commission, in the amounts established in the Federal Payments Act.

The use of properties belonging to the public domain, such as receiving bodies for discharges of wastewater, shall require payment of the fees established in the Federal Payments Act. Such payment does not absolve the payer from the need to comply with the provisions of this Law regarding pollution prevention and water quality control, the General Act with respect to the Ecological Balance and Environmental Protection, and the General Health Act.

TITLE NINE

NATIONAL PROPERTIES THAT ARE THE RESPONSIBILITY OF THE COMMISSION

Sole Chapter

Article 113. The Commission is responsible for administering the following national properties:

I. The parts of federal beaches and zones containing watercourses, under the terms of this Law;

II. The land covered by lakes, lagoons, estuaries and other natural deposits, whose waters are national property;

III. National watercourses;

IV. Shorelines and federal zones adjacent to watercourses, basins and deposits of water belonging to the nation, under the terms set out in Article 3 of this Law;

V. Land forming part of watercourses, lakes, lagoons and estuaries belonging to the nation which has been exposed as the result of natural or artificial causes;

VI. Existing and future islands in lakes, lagoons, estuaries, reservoirs and deposits, and in watercourses belonging to the nation, except for islands formed when water isolates land on the property of private parties, *ejidos* or communities;

VII. Water infrastructure financed by the Federal Government such as dams, dikes, reservoirs, canals, drains, ditches, aqueducts, irrigation districts and units, and other works constructed for water use, flood control and the management of national waters, including the land they occupy and buffer zones in the land area set aside in each case by the Commission;

In the cases of subsections IV, V and VII, when pertinent, properties shall be administered in cooperation with the Federal Electricity Commission;

Article 114. Should a permanent change occur in the direction of a national watercourse owing to natural causes, the nation shall automatically acquire ownership of the new channel and of the adjacent federal zone.

Should there be a permanent change in the level of a lake, lagoon, estuary or watercourse belonging to the nation, and the water invades land, such land, the adjacent federal zone or the corresponding federal maritime-land zone, shall pass into the public domain. Should a permanent change in water level expose land, it shall pass into the private domain upon the issuance of a decree severing it from the public domain.

In the event that surface waters show a tendency to shift from one body into another or to change course, the owners of adjacent land have the right to build the necessary works for protection. In the case of a permanent change, they have the right to build rectification works within one year of the date of the change. To proceed with the construction of works for protection or rectification it shall be sufficient to give written notice to the Commission, which may suspend or order changes to such works in the event they have caused or may cause damage to third parties.

Article 115. When there is a permanent change in the direction of a watercourse belonging to the nation, the property owners affected by the change have the right to receive, in replacement, a proportionate part of the area available, if any, outside the shoreline area or the federal zone, taking into account the amount of their land that was affected.

Otherwise, owners of shoreline properties bordering dried-up watercourses may acquire up to one half of the bed facing their property or the entire bed, if there is no interested property owner on the other side.

If no private property is affected or if no shoreline property owners are interested in an abandoned bed, it may be acquired by third parties.

In all events, the land must be severed from the public domain beforehand.

Article 116. Land exposed through artificial means as a result of channeling a watercourse or partially or totally confining or drying up a national basin shall pass from the public to the private domain under a decree severing the land from the public domain. Works that channel or confine the water shall be considered an integral part of the corresponding watercourses or basins, and of the respective federal and buffer zones, and shall therefore be subject to the federal public domain.

Article 117. For reasons of public interest, the Federal Executive Branch, through the Commission, may issue declarations reducing the size of the federal zone around watercourses, lakes or lagoons, and of the federal zone adjacent to water infrastructure or eliminating such zones entirely, in areas falling within municipal boundaries.

States, municipalities or private parties with interests in the lands referred to in this article, must first build control works and whatever other works are necessary for the reduction or elimination of a federal zone.

The Commission may allocate or auction the care, conservation and maintenance of such properties to state or municipal governments or interested private parties.

Article 118. The national properties referred to in this Title that are the responsibility of the Commission may be used, including construction materials located on them, by individuals or bodies corporate, under concessions granted by the Commission for this purpose.

The provisions of this Law and its regulations regarding water concessions shall apply with regard to the processing, duration, regulation and termination of the concessions referred to in this article.

Concessions shall terminate in the instances provided for in Article 27, if the use of national properties was granted as part of a concession or grant of national water rights.

Regardless of whether a community has received land and water through endowment, restitution or accession, the concession referred to in this law shall be required should construction materials located in watercourses, basins and federal zones be used or exploited.

For concessions in the federal zones referred to in this article, under equal circumstances, outside urban zones and for production purposes, preference shall be given to the owners or occupiers of properties adjacent to such federal zones.

TITLE TEN

INFRACTIONS, SANCTIONS AND APPEALS

CHAPTER I

Administrative Infractions and Sanctions

Article 119. Subject to the provisions of this Law, the Commission shall sanction the following infractions:

I. Discharging permanently, intermittently or exceptionally wastewater in contravention of the provisions of this Law into receiving bodies belonging to the nation, including the sea, and discharges that infiltrate national land or other land, which could contaminate the subsoil or an aquifer, which does not preclude application of the sanctions contained in the legislation on health, the ecological balance and environmental protection;

II. Making use of national wastewater without complying with official Mexican standards governing quality and the special requisites established for this purpose;

III. Using national waters in larger volumes than users are entitled to under the respective concessions or the Public Registry of Water Rights;

IV. Occupying basins, watercourses, canals, federal zones, buffer zones or other properties referred to in Article 113, without a concession from the Commission;

V. Altering the authorized infrastructure for the use of water or operating it without permission from the Commission;

VI. Failing to maintain the works or installations as established in the regulations or other standards or directives issued by the competent authority in order to safeguard against damage to third paries or to the development of water supply sources or watersheds;

VII. Failing to install devices to record or measure water quantity and quality under the terms established in this Law, its regulations and other applicable directives or modifying or altering installations or equipment intended to meter the volumes of water used, without permission from the Commission;

VIII. Using national waters without the respective concession, when required under the terms of this Law or modifying or diverting watercourses, basins or rivers belonging to the nation without permission from the Commission or damaging or destroying water infrastructure belonging to the nation;

IX. Executing for oneself or for third parties works to tap, extract or obtain groundwater in regulated, restricted or reserved zones, without permission from the Commission; the person who ordered execution of such works shall also be sanctioned;

X. Obstructing visits, inspections or examinations by the Commission under the terms of this Law and its regulations;

XI. Failing to provide the information required by the Commission to verify compliance with the provisions of this Law, licenses of concession, allocations or permits;

XII. Adding larger volumes of water than are normally contained in discharges of wastewater to dilute them in an attempt to comply with the official Mexican standards governing the ecology or the special regulations for discharges;

XIII. Supplying national water for human consumption that fails to comply with the applicable quality standards;

XIV. Illegally dumping or depositing refuse, dangerous toxic substances or sludge from wastewater treatment processes into rivers, watercourses, basins, the sea or other deposits or currents of water or allowing materials or substances that pollute groundwater to infiltrate into the subsoil;

XV. Failing to comply with the requirements contained in licenses of concession, allocations or permits;

XVI. In the case of a concession holder or assignee, failing to apply to be registered in the Public Registry of Water Rights, under the terms set out in this Law and its regulations;

XVII. Squandering water in contravention of this Law and its regulations;

XVIII. Any other violation of this Law or its regulations not mentioned above.

Article 120. The infractions mentioned in the preceding article shall be sanctioned administratively by the Commission, with fines equal to the following number of days times the general minimum daily wage in effect in the geographic area where the infraction was committed, at the time it was committed:

I. 50 to 500 for violation of subsections VI, XI, XV and XVIII;

II. 100 to 1,000 for violation of subsections II, III, IV, VII, X, XVI and XVII;

III. 5,000 to 10,000 for violation of subsections I, V, VIII, IX, XII, XIII and XIV.

In the cases dealt with in Article 119 (IX), the infractors shall forfeit the works built to tap and use water belonging to the nation, and the machinery and drilling equipment shall be impounded until the damages have been paid.

Article 121. For the sanctions dealt with in this chapter, the penalties shall be determined taking the following into consideration:

I. The seriousness of the infraction;

II. The economic condition of the infractor;

III. Recidivism.

Should the deadline allowed by the authorities to remedy an infraction or infractions expire without this having been done, fines may be imposed for each day that passes without the order being obeyed, although the total fine may not exceed the maximum permitted under the foregoing article.

In the case of second offenses, the original fine may be doubled, although it shall not exceed double the permissible maximum.

Article 122. In the cases of Article 119 (I, IV, VIII, IX and XII), and for second offenses under any of the subsections of that article, the Commission may also order the partial or total, temporary or permanent, closure of wells and works or intakes for the extraction or use of national water.

The Commission may also order closure in cases of:

I. Failure to obey an order suspending activities or the permits to discharge wastewater mentioned in Article 92, in which event the company or establishment directly responsible for the discharge may be closed permanently or temporarily;

II. Illegal use of infrastructure to obtain national water, in the absence of the permit required under this Law, and in the case of clandestine or illegal wells.

The employees designated by the Commission to enforce a closure shall keep a detailed record of the proceeding. If the infractor refuses to sign it, this shall not invalidate the record, and the circumstance shall be recorded in the presence of two witnesses chosen by the interested party or if the party is absent or refuses to choose, two witnesses chosen by the Commission.

To enforce a closure, the Commission may request the assistance of federal, state or municipal authorities, and call upon public security bodies to intervene within their sphere of authority.

Should the basins, watercourses, federal zones or other related national properties to which this Law pertains be occupied through the construction of any type of work or infrastructure without the necessary permit, the Commission is empowered to remove or demolish them at the infractor's expense, which shall not preclude other sanctions.

Article 123. The proceeds of the fines levied for infractions of this Law shall go specifically to the Commission. Sanctions under this Law shall not preclude fines for fiscal infractions or criminal sanctions.

The Commission shall notify individuals and bodies corporate that fail to abide by the provisions and terms of this Law of the amounts they owe for the construction or demolition of works performed by the Commission itself.

The amounts owing under this article shall be treated as taxes due for the purposes of recovery.

CHAPTER II

Appeals

Article 124. Actions or final decisions of the Commission that cause injury to private parties may be appealed for review within the 15 working days following the date on which notice of them was given. Interested parties also have the option of filing appeals for review.

The review may revoke, amend or uphold the decision under appeal, and rulings shall contain a description of the action under appeal, the legal grounds and the decision. The regulations to this Law shall establish the terms and other requisites for filing and substantiating an appeal for review.

Appeals for review shall be submitted in writing to the head of the Commission, giving the name and address of the appellant and the complaints, accompanied by such evidence as is warranted, and proof of the appellant's legal status.

If a fine has been imposed, payment shall be suspended until the appeal has been decided, provided that payment is guaranteed in keeping with fiscal requirements.

If appeals for review are lodged against acts or decisions of the Commission relating to fiscal matters under this Law, they shall be decided by the Commission pursuant to the terms of the Federal Tax Code and its regulations.

TRANSITORY ARTICLES

One. This Law shall come into effect on the day following its publication in the *Diario Oficial de la Federación*.

Two. The following are revoked:

I. The Federal Water Law published on January 11, 1972 in the *Diario Oficial de la Federación*;

II. All provisions that are contrary to this Law.

Three. Existing declarations stating that certain waters belong to the nation, prohibitions, regulations and reserves relating to national waters decreed by the Federal Executive Branch government shall remain in legal effect.

Four. Concessions, allocations and permits issued under the Federal Water Law of January 11, 1972 shall continue in effect under the terms contained in the license, and must be recorded in the Public Registry of Water Rights in keeping with this Law.

Rights may be conveyed under the terms contained in this Law.

Five. Should the Commission find that the information in licenses of concession or allocation issued prior to the entry into effect of this Law is erroneous or does not reflect the amount of water used, it shall inform the holder, allowing interested parties 30 calendar days to state their case and provide the data and documents required of them.

The Commission shall reach a decision within not more than three months, based on the response by the interested party and the information on file and, if warranted, shall order the license to be corrected and recorded in the Public Register of Water Rights.

Six. Applications under consideration for the use of national surface water or groundwater in restricted or regulated zones shall be decided under the terms of this Law.

Business of any kind that has not been settled as of the date on which this Law becomes effective shall be settled, in aspects favorable to the interested parties, in keeping with its provisions.

Seven. Precarious rights granted prior to the entry into effect of this Law shall be regulated by the legal provisions or regulations in effect at the time they were granted.

Notwithstanding, the holders of precarious rights granted by the Commission who have used national waters during the five years prior to the entry into effect of this Law may register in the Public Registry of Water Rights following the procedure set out in the regulations to this Law.

Precarious rights recorded in the Pubic Water Rights Register shall give their holders the right to use national waters for a period of not less than 10 years after this Law comes into effect. They must exercise their rights and comply with the obligations set out in this Law for concession holders, and shall be subject to its provisions regarding the regulation, modification or termination of such rights and obligations.

Persons holding precarious rights who receive water for irrigation in the irrigation districts shall be governed by the provisions of the regulations governing the respective district and not by the provisions of this article.

Eight. The irrigation districts and units for which the Commission is presently responsible must adjust to conform to the provisions of this Law within a period not to exceed three years after its entry into effect.

The Commission shall provide assistance for compliance with the preceding paragraph, for which purpose it shall reach agreements with users regarding the necessary actions.

The Commission shall make the necessary decisions until such time as the users take charge of the management of irrigation districts or units.

Nine. Until regulations for irrigation districts are drawn up pursuant to this Law, current regulations, directives and other rules regulating their organization and operation shall continue to apply. Also, until district regulations are drawn up to regulate distribution in the event of water shortages, the system set out in Article 60 of the Federal Water Law of January 11, 1972 shall continue to apply.

Ten. Until official Mexican standards are issued pursuant to the Federal Measures and Standards Act, the technical ecological and water standards issued by different Federal Government bodies shall continue to apply, as provided for in transitory article three of that Act.

Eleven. Existing drainage districts shall be considered drainage units for the purposes of this Law.

Twelve. The decrees and regulations that create and regulate the structure and powers of the Technical Council, the Office of the Director General and the other administrative units of the Commission, shall continue in effect until regulations regarding their organization and operation are issued under the terms of this Law.

Thirteen. Until such time as the watershed councils referred to in this Law begin to operate, the provisions of Article 27 of the Federal Water Law of January 11, 1972 shall continue to apply.

The National Water Law was published in the *Diario Oficial de la Federación* on December 1, 1992. This edition, prepared by the National Water Commission, through the Legal Unit, and supervised editorially by the Information and Citizen Participation Unit, consists of 70,000 copies and was printed by Litográfia IM de Mexico, S.A. de C.V., in the month of December 1992.

Annex 2

NATIONAL WATER COMMISSION

INSTRUMENT AWARDING CONCESSION

FARMER-USERS ASSOCIATION, IRRIGATION UNIT K-95, UPPER MAIN CANAL, IRRIGATION DISTRICT NO. 041, RIO YAQUI, A.C.

STATE OF SONORA **JANUARY 1992**

INSTRUMENT AWARDING WATER CONCESSION AND PERMIT TO USE IRRIGATION INFRASTRUCTURE IN IRRIGATION

DISTRICT NO. 041, RIO YAQUI, SONORA

Concession granted by the Federal Executive Branch through the National Water Commission, a deconcentrated administrative organ of the Secretariat of Agriculture and Hydraulic Resources, represented by its Director General, Fernando J. González Villareal, to "FARMER-USERS ASSOCIATION, IRRIGATION UNIT K-95, UPPER MAIN CANAL, IRRIGATION DISTRICT NO. 041, RIO YAQUI, A.C.," for the use of national water resources for the supply of water for irrigation purposes in the District concerned, pursuant to Article 35, XXIV and XXV of the Organic Law of the Federal Public Administration; Articles 5, 6 and 17, IV and VI, and Articles 22, 59, 60, 61, 73 and others relative to the Federal Water Act; Articles 29, 30 and 31 of the Internal Regulations of the Secretariat of Agriculture and Hydraulic Resources, in addition to a permit to use irrigation infrastructure, pursuant to Articles 73, 131, 148, 155, 156, 157 and others relative to and consistent with the Federal Water Act, based on the following:

DECLARATIONS

1. The National Water Commission, a deconcentrated administrative organ of the Secretariat of Agriculture and Hydraulic Resources, created by Presidential Decree published in the Official Gazette of the Federation on January 16, 1989, hereinafter called "the Commission," hereby grants a concession for the use of water for irrigation purposes, as well as a permit for the use of irrigation infrastructure, to the Rural Development Irrigation Module or Unit "FARMER-USERS ASSOCIATION, IRRIGATION UNIT K-95, UPPER MAIN CANAL, IRRIGATION DISTRICT NO. 041, RIO YAQUI, A.C.," forming part of the above-mentioned Irrigation District, hereinafter called "the Concession Holder."

2. The location of the irrigation infrastructure forming the subject of the permit, the stream supplying it and the intake works through which the Concession Holder's water allocation will be delivered are shown in the general plan of the irrigation district and Module (Annex No. 1). The inventory of infrastructure is given in Annex No. 2, and these documents, as well as all other annexes, are deemed to form an integral part of the present Instrument.

3. The module referred to in the foregoing Declarations is recognized by the Secretariat of Agriculture and Hydraulic Resources as a Rural Development

Irrigation Unit pursuant to Article 73 of the Federal Water Act, retaining its status as part of the infrastructure of the Irrigation District, to provide rural communities with irrigation services, the corresponding water concession being granted as provided by law.

4. The Concession Holder's user register, which forms part of the District's user register, is given in Annex No. 3, and contains the name of the user and the irrigation area presently registered.

5. The Concession Holder has given proof to the Commission of its status of juridical person, with the requisite competence and technical and economic capacity to hold this concession and permit, having given evidence that it was created and constituted for the purpose of operating, maintaining and managing the above-mentioned module, submitting Articles of establishment of a Civil Association, which also form part of this Instrument as Annex No. 4.

6. The Concession Holder is of Mexican nationality, having been established under the laws of the United Mexican States.

7. The domicile of the Concession Holder is at Mayojusalit, Block 1728, Municipio de Etchojoa, Sonora, Mexico.

CONDITIONS

1. The purpose of the present Concession is to authorize the use of national water resources for purposes of irrigation of the Concession Holder to use national water resources to supply water for irrigation in the above-mentioned Module, prior to bulk water delivery of water by the Commission.

2. The purpose of the present Concession is to authorize the Commission, through its decentralized administration, to use the infrastructure comprising the Module, including the secondary canal network, the internal drainage network, the respective roads and other installations, and the available machinery and equipment specified by the Commission, to supply irrigation service to users of the Module, said infrastructure to be delivered, through issue of a detailed instrument, within 60 days following signature of the present Instrument. The headworks shall be operated, maintained and managed by the Commission at the users' expense.

3. The Concession Holder agrees that it will, together with the other Concession Holders in the District, set up a limited liability company [Sociedad de Responsabilidad Limitada de Interés Público y Capital Variable] conforming to a permit and model Articles of Association to be provided by the Commission, hereinafter called "the Company," to provide them with the services of operation, maintenance and management of the major canal network, drainage network, their respective roads, the other additional infrastructure covered by the permit, and the machinery and equipment available to the Commission, and also to represent them.

   The Commission shall remain the authority in the decentralized Irrigation District pursuant to the law and the present Instrument, in which capacity it shall at all times ensure that the Concession Holder complies with the law, with the provisions of this Instrument, and with the Operating, Maintenance and Management Instructions attached hereto as Annex No. 5.

4. The irrigation service fee to be paid by the users shall be set in accordance with the Operation, Maintenance and Management Instructions (Annex No. 5) and shall be divided into three parts:

   (a) The part payable to the Concession Holder, which shall be sufficient to cover all costs of operation, maintenance and management of the Module, and which shall be proposed by the Concession Holder to the Commission through the Company, to be studied by both bodies and authorized by the Commission.

   (b) The part payable to the Company for its services, which shall be sufficient to cover the proportionate share of the operating, maintenance and management costs mentioned in Condition 3, and which shall also be proposed by the Concession Holder to the Commission through the Company, to be studied by both bodies and authorized by the Commission.

   (c) The part payable to the Commission to cover the normal costs of operation, maintenance and management of the headworks for bulk water supply, of irrigation and drainage engineering activities, and of supervision, in compliance with current legislation. The Company shall participate in the task of setting the above-mentioned costs.

5. The irrigation service fee shall be adjusted periodically, in conformity with the procedure set forth in the Operation, Maintenance and Management Instructions (Annex No. 5).

6. Charges for the use of the secondary network regarding which a permit is issued under the present Instrument may not be transferred or assigned to third parties.

7. This Concession and Permit are granted for 20 years from the date of issue, which period may be extended.

8. The Commission shall have the following functions and obligations:

   I. Determine and publicize at the beginning of each agricultural cycle the volume of water available for formulation of the District irrigation plan, thus enabling the Concession Holder to formulate its own irrigation plan, based on the volume allocated to it under the Operating, Maintenance and Management Instructions, and submit this plan through the Company to the Commission for authorization.

   II. Deliver water in bulk through the Company to the Concession Holder to be piped to the control point(s) set up, and ensure that this piping and distribution of water by the Company is performed efficiently so that each Concession Holder receives its allocated volume at the appropriate time.

   III. Ensure that water distribution by the Concession Holder to the interior of the Module takes place efficiently, so that users receive their allocated volumes at the appropriate time; enforce application of the regulations governing use of water for irrigation purposes, depending on the quality of the water and on the type and destination of the crops concerned.

   IV. Authorize the Concession Holder through the Company, during a given agricultural cycle, to use all or part of the water on lands different from those specified in the Concession, within the limits of the District.

   V. Together with the Concession Holders and the Company, draw up, revise and amend the Operating, Maintenance and Management Instructions.

   VI. Establish the user register and keep it permanently up to date, based on documentation and information that the users are required to supply directly, the Concession Holder keeping informed through the Company.

VII. Notify the Concession Holder through the Company of the essential hydrometric data and production statistics requirements mentioned in the Operating, Maintenance and Management Instructions (Annex No. 5), at specified regular intervals.

VIII. Observe and record:

(A) As an ongoing practice water quality, at all sources of supplyÄirrigation canals, drains and groundwater, with a view to preventing and/or correcting, in coordination and as a joint effort with the Concession Holder and the Company, any problems of contamination causing deterioration in the ecosystem.

(B) As an ongoing and systematic practice: the physical, chemical and biological conditions of the irrigated soils, to identify factors causing soil degradation and propose the appropriate preventive and corrective measures.

(C) Periodically: variations in groundwater levels, proposing a series of prioritized actions to correct negative impact on the soil and crops.

IX. Provide the Concession Holder with available machinery and equipment (Annex No. 2) to carry out maintenance programs, in accordance with the delivery specifications set forth in the Operating, Maintenance and Management Instructions (Annex No.5).

X. Approve the Concession Holder's annual irrigation infrastructure maintenance programs, which shall first be compiled by the Company for authorization by the Commission.

XI. Ensure that maintenance programs are carried out as approved in the interest of all Module users, and take appropriate action in the event that satisfactory operation of the system is jeopardized by deviations from the program.

XII. Provide technical advice as requested by the Concession Holder in connection with preparation of the annual maintenance programs for the infrastructure forming the subject of the permit, machinery maintenance and repair, and compilation of the unit prices of the corresponding works.

XIII. Disseminate knowledge in the areas of irrigation technology and productivity, salinity and drainage, land-use planning, and laboratory techniques for water, soil and plant analysis, and on all other aspects deemed relevant.

XIV. Provide support to the Concession Holder and, as the case may be, the Company, in connection with their training programs, with a view to developing and enhancing their technical and administrative capacities.

XV. Notify the Concession Holder through the Company of the reporting requirements relative to the maintenance programs for the infrastructure forming the subject of this permit, as provided in the Operating, Maintenance and Management Instructions.

XVI. Authorize the irrigation service fee, broken down as specified in Condition 4.

XVII. Collect from the Concession Holder the share of the irrigation service fee for bulk water supply and, in the event of nonpayment, suspend supply as provided by law.

XVIII. Organize and carry out, with the participation of the Concession Holder and the Company, all works of infrastructure protection and/or repair deemed necessary in the event of an emergency.

XIX. Handle all complaints and suggestions submitted by the Concession Holder's user members concerning deficiencies in operation, maintenance or management of the Module, the Company, or the District.

9. The Concession Holder shall have the following functions and obligations:

I. Manage the assets for which a concession and permit have been granted in the respective Module, pursuant to the law, under the present Instrument of Concession and Permit and the Operating, Maintenance and Management Instructions, operating through the organizational structure shown in said Instructions.

III. Prepare the irrigation plan along the lines set forth in Condition VIII, paragraph I.

III. Receive water in bulk through the Company at its control point(s) and distribute it among the users of the Module in the appropriate volume, using metering structures to be installed by the users on their intake structures, supervised by the Concession Holder, all necessary technical assistance being furnished by the Company and the Commission.

IV. Provide users with an efficient irrigation service, delivering water in accordance with the programmed demand, in the volume and at the time required.

V. Ensure that users make efficient use of the water delivered to them as provided in paragraph IV above, and apply all appropriate corrective measures whenever losses are detected. Such occurrences shall be reported to the Commission and the Company.

VI. Furnish hydrometric and statistical information to the Commission through the Company, using the forms supplied to it for the purpose.

VII. Prepare annual maintenance programs for the infrastructure for which the permit has been granted, to keep it in good condition, and, if appropriate, prepare programs for the maintenance and repair of the machinery and equipment for which it is responsible, both programs being submitted by the Company to the Commission for its approval, for subsequent implementation by the Concession Holder.

VIII. Use the machinery and equipment provided by the Commission solely and exclusively for the performance of maintenance works on the infrastructure for which this permit has been granted, in accordance with the approved program, except for the provisions of Condition XVIII below.

IX. Together with the Company and the Commission, negotiate with the users the installation of groundwater observation wells within the limits of the Module, ensuring free access by Commission employees to those wells.

X. With the Company and the Commission, negotiate with the users the procedures for enabling Commission employees to take samplings of canal water, groundwater, and water from drains within the Module, ensuring adherence to the supervisory measures established by the Commission to avoid or correct environmental deterioration.

XI. Supervise the use of irrigation water in each plot, in terms of volume and timing, so as to upgrade the production and productivity of the crops concerned.

XII. Propose to the Commission, through the Company, the proportion of the irrigation service fee to be allocated to the Concession Holder and to the Company, as provided in Condition IV.

XIII. Charge users an irrigation service fee, and in the event of non-payment, suspend service as provided in Article 80 of the Federal Water Act.

XIV. Manage the amounts collected for irrigation service, the Commission receiving payment for bulk water supply. Should a surplus remain after the costs of operation, maintenance and management of the Concession Holder and the Company have been met, such surplus shall be used systematically for infrastructure improvement, for machinery and equipment, and for purchases benefiting the general operation and development of the Module, subject to approval by the Concession Holder's Assembly.

XV. Carry out works, purchase and/or rent machinery and equipment for the improvement, expansion and/or modernization of infrastructure in the Module, subject to prior approval by the Concession Holder's Assembly, establishing for this purpose any additional specific fees that may be required. The performance of works altering and/or expanding the infrastructure forming the subject of this permit shall require authorization by the Commission.

XVI. Refrain from pledging the present or future proceeds of fees paid for the irrigation service as a guarantee or collateral for the performance of obligations entered into by the Concession Holder.

XVII. Keep accounts of its budget execution and submit annually to the Concession Holder's Assembly, to the Company, and to the Commission financial statements examined by a certified public accountant and facilitate such audits as the Commission shall determine.

XVIII. In emergency situations, entrust to the Commission all available personnel, machinery and equipment, with a view to executing any defensive works or repairs that may be urgently needed to safeguard the infrastructure, as well as communities and human lives.

XIX. Ensure that officers are appointed from different sectors on a rotating basis to the Management Board, and take steps to confirm their integrity. Provision shall be made to this effect in the Concession Holder's Articles of Association.

XX. Put before the Commission all complaints and suggestions raised by users of the Module regarding services provided by the Commission, the Company, and/or the Concession Holder with respect to the operation, maintenance and management of the Module and of the District.

XXI. Hire full-time trained workers, at its own expense, such workers having no labor relations with the Commission.

XXII. At its own expense, pay compensation to its workers and to users and third parties, and to the Federal Government, in respect of actions or any other event related to the use of the goods forming the subject of this concession and permit.

XXIII. All other functions and obligations provided for in the legislation, in the present Instrument, and in the Operating, Maintenance and Management Instructions for the Module.

10. The Concession Holder shall be subject to administrative or civil penalties and/or punitive measures, pursuant to the law, in the event that it:

I. Puts the water to a use different from the one for which the concession was granted.

II. Uses the proceeds of irrigation service fees received from the users for purposes different from those specified in the present Instrument.

III. Uses the machinery, equipment or installations provided by the Commission for purposes other than those specified in this Instrument.

11. This concession and permit may be revoked should the Concession Holder repeatedly, and without heeding the Commission's recommendations:

    I. Alter the manner of using the water and infrastructure without the Commission's authorization.

    II. Fail to provide the Commission with the information and documentation required of it pursuant to the present Instrument.

    III. Fail to maintain in good condition the irrigation infrastructure forming the subject of this permit and the machinery and equipment furnished to it by the Commission.

    IV. Fail to make timely payment to the Commission of the charge for bulk water supply, and fail to make payment for the services provided by the Company.

    V. Fail to discharge the obligations stipulated in the present Instrument in the case of an emergency.

    VI. Amend its Articles of Association without authorization from the Commission.

    VII. Fail to comply with any of the obligations set forth in this Instrument and/or in the Operating, Maintenance and Management Instructions.

    VIII. Engage in any of the actions mentioned in Article 138 of the Federal Water Act.

12. The following shall give cause for cancellation of the present Instrument of Concession and Permit: expiration of its period of validity, disappearance of the grounds for its existence, and the acts and omissions mentioned in Clause 11 of this Instrument.

13. Revocation or cancellation of the concession granted shall give rise to termination of the respective permit.

* DONE in Ciudad Obregón, this 30th day of January, 1992

SIGNATURES

For the Commission:

Fernando J. González Villareal, Director General
César Octavio Ramos Valdez, Assistant Director General for Irrigation Infrastructure
José Luis Trava Manzanilla, Irrigation Districts Manager
Fernando Rueda Lujano, Northwestern Regional Manager
Porfirio Isasi de la Garza, State Manager in Sonora
C.P. Benjamin Estrella Serna, Chief Operations and Maintenance Engineer,
Irrigation District 041, Río Yaqui

For the Concession Holder:

Joel Armenta Dominguez, President
Roberto Monsivais Coronado, Administrative Secretary
Dubier Valle Beltrán, *Secretario de Actas*
Manlio Vejar Maldonado, Treasurer

Honorary Witness:

Carlos Hank González, Secretary of Agriculture and Hydraulic Resources

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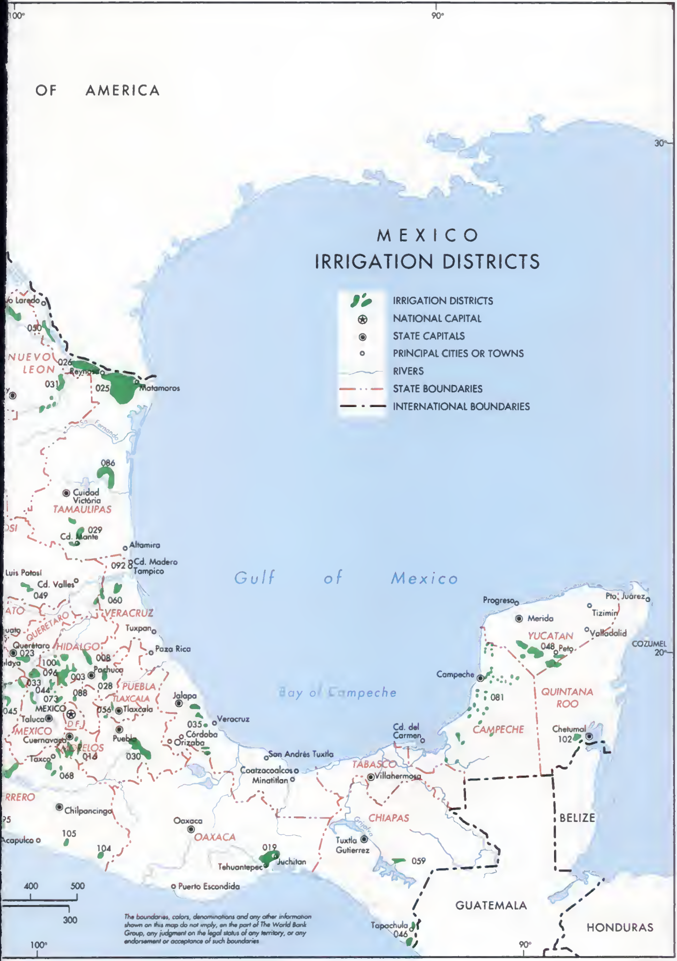

MEXICO
IRRIGATION DISTRICTS

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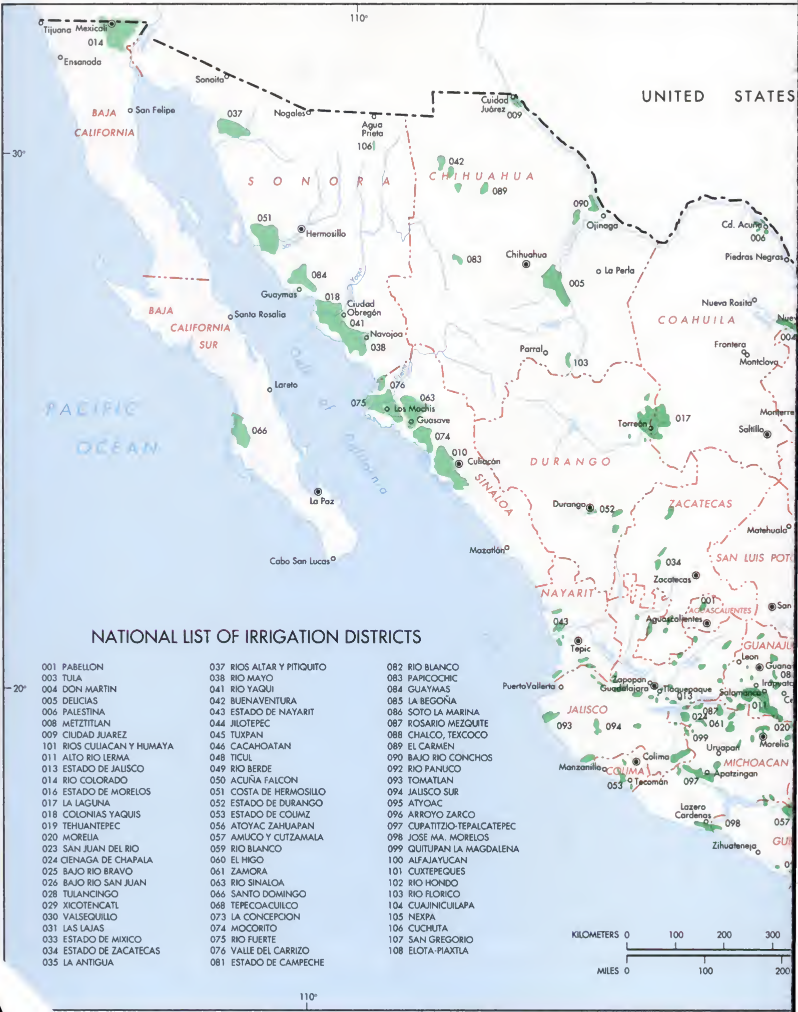

NATIONAL LIST OF IRRIGATION DISTRICTS

001	PABELLON
003	TULA
004	DON MARTIN
005	DELICIAS
006	PALESTINA
008	METZTITLAN
009	CIUDAD JUAREZ
101	RIOS CULIACAN Y HUMAYA
011	ALTO RIO LERMA
013	ESTADO DE JALISCO
014	RIO COLORADO
016	ESTADO DE MORELOS
017	LA LAGUNA
018	COLONIAS YAQUIS
019	TEHUANTEPEC
020	MORELIA
023	SAN JUAN DEL RIO
024	CIENAGA DE CHAPALA
025	BAJO RIO BRAVO
026	BAJO RIO SAN JUAN
028	TULANCINGO
029	XICOTENCATL
030	VALSEQUILLO
031	LAS LAJAS
033	ESTADO DE MIXICO
034	ESTADO DE ZACATECAS
035	LA ANTIGUA
037	RIOS ALTAR Y PITIQUITO
038	RIO MAYO
041	RIO YAQUI
042	BUENAVENTURA
043	ESTADO DE NAYARIT
044	JILOTEPEC
045	TUXPAN
046	CACAHOATAN
048	TICUL
049	RIO BERDE
050	ACUÑA FALCON
051	COSTA DE HERMOSILLO
052	ESTADO DE DURANGO
053	ESTADO DE COLIMZ
056	ATOYAC ZAHUAPAN
057	AMUCO Y CUTZAMALA
059	RIO BLANCO
060	EL HIGO
061	ZAMORA
063	RIO SINALOA
066	SANTO DOMINGO
068	TEPECOACUILCO
073	LA CONCEPCION
074	MOCORITO
075	RIO FUERTE
076	VALLE DEL CARRIZO
081	ESTADO DE CAMPECHE
082	RIO BLANCO
083	PAPICOCHIC
084	GUAYMAS
085	LA BEGOÑA
086	SOTO LA MARINA
087	ROSARIO MEZQUITE
088	CHALCO, TEXCOCO
089	EL CARMEN
090	BAJO RIO CONCHOS
092	RIO PANUCO
093	TOMATLAN
094	JALISCO SUR
095	ATYOAC
096	ARROYO ZARCO
097	CUPATITZIO-TEPALCATEPEC
098	JOSE MA. MORELOS
099	QUITUPAN LA MAGDALENA
100	ALFAJAYUCAN
101	CUXTEPEQUES
102	RIO HONDO
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